TN 295
.U4

8788
1979

IC 8788

Bureau of Mines Information Circular/ 1979

OCT - 1979

Taxation, Mining, and the Severance Tax

UNITED STATES DEPARTMENT OF THE INTERIOR

United States Bureau of Mines

Information Circular 8788

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By Karl E. Starch

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BUREAU OF MINES
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TN23
.U7
no.
8788, 1979

This publication has been cataloged as follows:

Starch, Karl E.

Taxation, mining, and the severance tax / by Karl E. Starch. [Washington] : U.S. Dept. of the Interior, Bureau of Mines, 1979.

65 p. : diagrs., map ; 27 cm. (Information circular - Bureau of Mines ; 8788)

Bibliography: p. 63-65.

1. Mines and mineral resources - United States - Taxation. I. United States. Bureau of Mines. II. Title. III. Series: United States. Bureau of Mines. Information circular - Bureau of Mines ; 8788.

TN23.U71 no. 8788 622.06173

U.S. Dept. of the Int. Library

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Washington, D.C. 20402

Stock Number 024-004-01945-0

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TAXATION, MINING, AND THE SEVERANCE TAX

by

Karl E. Starch[1]

ABSTRACT

This Bureau of Mines report is a background study of severance taxes on mineral production. The rates, bases, and other features of State severance tax legislation as of March 1978 are presented, as are the amounts of State severance tax collections for fiscal year 1977. Some statistical comparisons between severance tax collections, total State tax collections, and total value of mineral production in the States involved are presented to portray the relative importance of severance taxes both in State tax revenue systems and in mineral industry revenues. A general discussion of the purposes and principles of taxation, the unique nature of a mining enterprise, the various types of taxes imposed on mineral production, and the character and rationale of the severance tax and its impacts on mining firms sets the severance tax in perspective. A bibliography of materials on the severance tax is included.

INTRODUCTION

Taxation of mines is as old as mining. Yet the question of the proper type and level of taxation is a matter of continuing controversy. Mining activities have been taxed both heavily and lightly because of the wide range of approaches to taxation at different times and locations. Two basic problems regarding mine taxation are to determine (1) the kind of tax that should be imposed and (2) the amount of tax.

The first problem is perhaps the more fundamental, being of a conceptual or general nature whereas the second is technical and specific. Taxes are compulsory payments imposed by the various levels of government to provide the revenue required for public services. There is no question that mining enterprises should contribute to the support of public services as do all other business enterprises. The real question in mineral taxation is whether mining is different enough from other types of business enterprise to require or justify a different tax treatment, and if this is true, what is the appropriate way to tax the industry.

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Responsible taxation of minerals recognizes the unique characteristics as follows of mining: (1) the principal asset of a mine is consumed in the course of production, (2) a large capital investment is generally required before any production takes place, (3) most such capital cannot be transferred to another location once the ore body is mined out, (4) the ultimate value of a deposit is not known until it has been depleted, and (5) once capital is committed, adjustment of output is more difficult than in many other types of business because of the large fixed costs which tend to promote overproduction.

Economic studies on industrial location generally have found little correlation between the level of taxes and industrial plant location. This is due in part to the relatively minor place of taxes among all costs. Nevertheless, tax policy differences between States are part of the investment climate and affect the rate of return a mining firm can anticipate. A tax that raises the cost of production in mining not only affects decisions about the original allocation of resources to that enterprise and the rate of return, but it also raises the cutoff grade of ore that can be profitably mined resulting in lower grade ore becoming unprofitable rock rather than valuable mineral. Thus, a tax can affect the level of mineral reserves and conservation as well as the rate of production and incentive to explore for minerals.

Several factors have heightened current interest in mining and mining taxes as a means of encouraging or discouraging mining. The shortage of certain minerals and/or the significant increase in prices have increased public awareness of the importance of minerals, particularly fuels, to our standard of living and lifestyle. At the same time an expanded environmental awareness has increased criticism of some of the physical impacts of mining. These concerns tend to pull in opposite direction by encouraging or discouraging new mining. Finally, there is a growing need for revenue by governmental jurisdictions at all levels. "Big," "rich," and "absentee-owned" mines are prime candidates for increased taxation, particularly if the tax would be borne by entities not within the controlling government's jurisdiction.

Mining firms experience the entire range of taxes that are imposed on all businesses and individuals such as income tax, property tax, sales tax, and special license and excise taxes. However, the severance tax is the only tax applied uniquely to the extraction of natural resources (renewable resources, such as timber and fish, as well as nonrenewable mineral resources), and is of particular interest to State governments wanting to increase their revenue from mining activity within their jurisdiction.

The purpose of this report is to study the severance tax within the perspective of the generally accepted principles and purposes of taxation, the characteristics of a mining firm that affect its taxpaying ability (or determine how a tax will affect it), and some of the alternative taxes that have been applied to mining. This study does not attempt to analyze specific effects of any proposed rate of severance tax on rate and level of output of specific commodities under particular conditions, nor does it provide a guide for computing taxes on a specific mine. Rather, the intent is to discuss some of the issues associated with the severance tax and to address such issues as (1) the arguments supporting or opposing it (2) how it differs from other taxes

that are imposed on mining, (3) in what ways a mining firm differs from other firms that might engender a different tax treatment, (4) how well the severance tax meets the criteria and purposes of taxation, and (5) does the tax meet these criteria and purposes better than other taxes.

This study also considers current applications of the severance tax, the amount of revenue yielded, and its significance in total State revenues. The rates of severance tax imposed by each State are also listed, but it will be noted that rates alone do not tell the whole story about actual tax burdens. Tax base, deductions, exemptions, other taxes, etc., all affect the actual impacts. A high rate on a small base might return less than a lower rate on a broader base. A severance tax that is in lieu of a property tax has a very different impact than one which is in addition to other taxes. Sources in which a more specific analysis of the effects of severance taxes on mining firm decisionmaking and the level of mineral reserves can be found are listed in the bibliography of this report.

There is considerable room for argument on classification of particular taxes as severance taxes or other types of taxes. The classification used here is that of the Commerce Clearing House in its State Tax Guide (8)[2] and the Bureau of the Census annual State Tax Collections (38), which is compiled from State data. Although there may be differences of opinion as to whether all State taxes that have features of severance taxes are included, these are the best general sources of such data and have the consistency and accuracy required to indicate the relationships and patterns appropriate for this study. (For a different classification, see Yasnowsky (42).) Contact was made with departments of revenue or tax commissions of various States to clarify State taxing policy and procedures and to obtain a more detailed analysis of tax data where required. A number of discussions with personnel of the Bureau of the Census aided in the understanding and use of their data.

There can be no definitive listing of State severance taxes because they may change at each session of each State legislature, and a number of States are particularly interested in the taxation of minerals at this time. The prospect of large-scale mineral production in relatively isolated areas; for example, coal in the Northern Great Plains, would require a large public investment in social capital as well as private investment in mineral production capital. In such cases, the local governments are eager that the mineral production activity support the attendant public expenditures. This particular case is complicated by the circumstance that most of the mineral will be exported for consumption out of State. Where there are conflicting interests, issues concerning equity could become very involved and tax policy is one medium through which governments often attempt to find a reasonable balance.

This study was made at the Intermountain Field Operations Center, Denver, Colo., as part of the Bureau of Mines continuing mission to assure an adequate, timely, and economical supply of minerals for the Nation. A better understanding of taxation's effects on mining decisions is particularly critical at this

[2]Underlined numbers in parentheses refer to items in the bibliography at the end of this report.

time of increased mineral need and development and environmental concern. From the standpoint of current Bureau of Mines programs, a better understanding of the interrelationships between taxation and mineral development and production contributes to the Bureau's extensive effort to gather and analyze a broad range of mineral information for its Minerals Availability System. It is anticipated that follow-on Bureau of Mines studies will delve deeper into the area of mineral taxation, building upon data being developed in this system.

PURPOSES AND PRINCIPLES OF TAXATION

Whether a tax is beneficial or detrimental depends upon the criteria by which the tax is judged and the purposes for which it is imposed. A particular tax must be judged in the context of the whole revenue system, not only other State taxes if it is a State tax, but Federal and local taxes as well. Taxation may be purely for nonfiscal purposes, that is, a method of social control. However, tax programs usually are designed to provide the revenue necessary to finance the public programs and services of the taxing entity. These programs and services in turn are based upon the economic, social, and political objectives of the governments involved. Public expenditure and the taxes imposed are not to nullify each other in their impacts. Translating economic and social objectives into tax policy is not a simple task, but without standards, principles, or goals, taxation can become arbitrary or even whimsical. The revenue problems confronting each governmental jurisdiction then are (1) determining the type and level of services to be offered and (2) establishing a revenue system to pay for them.

A tax can be defined as the compulsory contribution, or monetary burden, put upon persons or property to provide for the support of the government. The essential characteristics of a tax are that it is (1) an enforced contribution, (2) it is enacted by a sovereign power under its taxing power, and (3) it is to raise revenue to be used for public purposes. Theoretically, where there is no benefit there is no power to tax, but benefit is presumed from expenditure for a public purpose. There remain, of course, questions of validity of purpose. Much of the early controversy on this point of what constitutes a public purpose centered around public aid to the construction of railroads.

Although there is considerable overlap between the two, it seems useful to distinguish between the purposes for which taxes might be imposed and the principles by which the "goodness" or "badness" of a tax can be judged. The purposes are more likely to apply to an entire program and are the fundamental reasons for having special taxes, but they do not tell how efficiently or effectively the taxes function.

The following are among the purposes that usually underlie a tax system:

1. Raising Revenue.--Taxes provide the basic income to governments without which they cannot exist and without which they cannot provide services such as defense, public education, and public health and welfare. Occasionally the imperatives of acquiring needed revenue override all other

considerations surrounding imposition of a tax, and a tax might be imposed to raise revenue even if its other effects are detrimental.

2. Influence the Level, Direction, and Impacts of the Economy.--Most governments, believing that economic growth and full employment are fundamental goals, will tax and spend in a manner that is believed to encourage such objectives. The formation, or attraction, of capital to a particular locality is one aspect of economic development that taxation can affect. Certainly taxes affect discretionary income, that is, the amount of earnings the taxpayer has left for consumption or savings and investment. Corporate investment is encouraged through tax credits on certain types of investment.

One of the most commonly cited economic goals of taxation is that of price stability. Through controlling its own spending and taxing, a government can contribute to or inhibit inflation. Tax policy may also influence efficient allocation of resources among competing uses and encourage or inhibit effective and efficient development of natural resources.

3. Redistribution of Wealth is a Major Objective of Taxation Policy of Some Governments.--Although often based on a social value judgment, advocacy of a redistribution of wealth as a desirable public policy may also be based on the belief that one pattern of wealth distribution is economically healthier than another. The redistribution of wealth effected by taxation may be between persons or it may be from private to public hands.

4. Taxes May be Imposed for the Purpose of Regulation.--A tax may be imposed for nonfiscal purposes, such as to influence social behavior patterns and as a means of enforcement. Taxes on purchase and consumption of particular goods, such as alcohol and tobacco, and in enforcement of pollution controls are examples. Examples that apply specifically to the mining industry include the "reclamation fees" imposed by the Surface Mining Control and Reclamation Act of 1977 ($0.35 per ton on surface mined coal, $0.15 per ton on deep-mined coal, and $0.10 per ton on lignite), to go into a trust fund for the reclamation of land and water disturbed by mining, and the Black Lung Revenue Act March 1978, which uses an industry tax of $0.50 per ton on deep-mined coal and $0.25 per ton on surface mined coal to compensate coal miners and their survivors for disability or death suffered due to black lung disease.

Criteria of a Sound Tax

Despite the common feeling about taxes, a tax is not inherently beneficial or detrimental and can be evaluated in terms of how well or how poorly, it does what it is intended to do. There is no single set of criteria or principles against which to evaluate the relative merits of particular taxes, and no single tax can be expected to satisfy all criteria equally. Actually, it is more reasonable to judge the adequacy of an entire tax program and perhaps the place of a single tax within that system.

In one of the earliest books on political economics commonly known as the Wealth of Nations, Adam Smith (32) presents a list of canons of taxation--equity, certainty, convenience, efficiency, plus adequacy--which are still widely applicable.

1. Equity.--Equity is a matter of how the burden of paying a tax is distributed. Taxpayers similarly situated should be treated equally under the law. Tax differentiation is based upon relevant differences among taxpayers, such as ability to pay or benefits received. If taxpayers at the same income level are taxed equally, this is horizontal equity (however, taxpayers with the same number of dollars may not actually be in positions of equal ability to pay). If taxpayers at different income levels are also treated equally, relative to each other, this is vertical equity.

Application of the benefit principle is not always clear in weighing government services. Even where it is possible to determine who receives the greater benefit, it is not always feasible to apply the benefit principle because some beneficiaries cannot pay, as in the case of welfare and, to some degree, in public schools. Ability to pay is a more widely applied measure of equity, but even this is clouded by such issues as (1) whether a tax should seek minimum sacrifice, or proportional sacrifice, (2) whether the marginal utility of income gained or lost to all individuals involved, can be measured and (3) whether progressive taxes are more equitable than regressive taxes.

2. Certainty and Convenience.--A tax should be designed and stated with such simplicity and clarity that every taxpayer affected knows and understands exactly what his obligations are and is able to comply with a minimum of difficulty and cost.

3. Efficiency and Ease of Administration.--The ratio between the cost of collecting a tax and the amount of money collected is one measure of efficiency in tax administration. A low ratio of costs to collection, however, does not by itself indicate efficient tax administration. Another measure of efficient tax administration is the degree to which each taxpayer pays his proper share of tax as required by law. An efficient tax would not be easily evaded or avoided; taxes that are unduly selective, punitive, or inequitable encourage avoidance.

4. Adequacy or Productivity.--Tax revenues are the source of monies needed to carry on the functions of government and must produce revenue adequate for such functions. Consequently, other factors being equal, the best tax from the point of view of government is that which yields the most revenue. Related to the adequacy of a tax is its stability over a period of time. Whether it produces adequate revenue throughout the economic cycle is an important factor. Inflexible continuity, however, is not always a desirable feature and can produce unwanted surpluses and deficits. Tax elasticity, which is a term used to describe how much tax revenue changes as the base upon which it is imposed increases or decreases, is one measure of the stability and adequacy of any particular tax.

Adam Smith's canons have been extended to meet changing needs and goals of society. One important issue in taxation which may be an extension of Smith's equity and efficiency criteria is neutrality. Recognizing that every tax probably exerts some influence on the willingness or ability of an individual or firm to undertake an economic act, it is important that a tax should not encourage inefficient allocation of resources by being so dominant that

taxpayers make counterproductive economic decisions, both short and long range, on the basis of tax effects. Tax neutrality is an important aspect of inter-taxpayer equity. Other criteria may be discussed in such terms as practicality, attaining social and/or economic objectives, adaptability, and flexibility.

Elements of Taxation

The tax base is the subject or occurrence upon which the tax is applied. There are generally four bases upon which taxes are imposed:

1. Wealth.--This refers to a fixed ownership or control of wealth rather than a transaction in which wealth changes hands.

2. Income.--The process of receiving wealth.

3. Expenditures.--Any transaction involving spending.

4. Activity or Privilege.--A tax imposed upon engaging in a particular act or profession. Tax theory does not say which base government should rely upon. Different consequences, however, follow taxation of different bases.

The rate of tax is the amount charged for each unit taxed. The rate multiplied by the base is the amount of tax to be paid. A distinction should be made, however, between the ostensible rate and the effective rate of tax. The effective rate of tax is that amount paid after deductions and exclusions are calculated and may be quite different from the ostensible rate. In making comparisons of tax rates, it is essential to consider differences in the base upon which the tax is imposed and deductions or exclusions that can be removed from the base before the tax is calculated.

Types of Taxes

There are several major types of taxes generally used.

1. Income Tax.--Income tax may be on individuals, corporations, or other income-earning entities, and may be computed on ordinary income or excess profits. Production taxes, particularly the net production tax, have many characteristics of an income tax. The gross production tax has some elements of property tax.

2. Taxes on Real and Personal Property.--Fair and accurate appraisals of property value upon which to assess the tax are not always possible. There appears to be a trend away from use of the personal property tax, particularly that on intangible personal property. The property tax is one of the oldest and most used types of tax and is generally an ad valorem tax.

3. Transaction Tax.--The retail sales tax is the most common transaction tax, although such transactions as stock transfers and real estate transfers are also taxed. This is most likely to be an indirect and ad valorem tax, although a specific rate per number of units is also possible.

4. Excise Tax.--Excise taxes are imposed on selected commodities and/or activities, enjoyment of a privilege, or engaging in an occupation, but are not imposed on persons or property as such. Generally, excise taxes are indirect, but may be ad valorem or specific. All license taxes are excise taxes. Severance taxes are usually placed in this category.

5. Other.--Other types of taxes include employment taxes on employers and employees, franchise taxes, export and import taxes, and user taxes on various activities. The distinction between different types of taxes is not always precise.

The general pattern in use of these types of taxes by different levels of government is as follows:

National Government: Income tax.

State governments: Sales and excise taxes.

Local government: Property tax.

Taxes are not the exclusive preserve of a particular level of government, however, and practices or uses have changed over time. Multiple taxation of a an individual or activity is more the rule than the exception. Most States and a few local governments now impose income taxes, and the National Government imposes excise taxes on some goods. Both State and Federal Governments collect estate and inheritance and payroll taxes--the Federal Government for social security, and State governments for unemployment insurance. The Federal Government is constitutionally forbidden from levying property taxes, leaving them entirely to State and local governments. However, the Federal Government plays the predominant role in taxation. State and local government ability to tax is limited by the interstate and foreign commerce clauses of the Constitution, by Federal immunity and due process requirements, as well as by specific State constitutional limitations on taxing powers.

TAXATION APPLIED TO MINERALS

Mineral taxation varies from State to State, occasionally from county to county, and from one mineral to another. In some States mines are taxed as wealth, including minerals in the ground. Other taxing jurisdictions confine property taxes to surface improvements or tax mines in operation on the basis of production in lieu of property taxes. The choice of approaches to taxing minerals is based in part on the particular characteristics of the mining industry.

Nature of the Mining Firm and Taxation

Every industry has some distinguishing economic characteristics in which it differs from other industries. These characteristics determine the economic effect of a given tax and affect the decisionmaking of the individual firm. The distinctive characteristics of the mining industry include the following:

1. Exhaustibility.--The removal of each unit of ore further exhausts the basic asset of a mining firm--its ore deposit. Once mined and processed, the ore is gone and cannot be renewed. While the capital assets of all firms decline in value because of use or obsolescence and must be depreciated accordingly, ore deposits differ in not being replaceable and in the greater uncertainty in defining value. Although exhaustibility is not entirely unique to mining, it is a large element in the decisionmaking of a mining firm. Any given ore body must eventually be exhausted which presents a difficult problem to tax officials and planners.

2. Uncertainty in the Measure and Valuation of Ore Deposits.--Besides the market risks that face all firms, mining firms have the additional uncertainty of not being able to determine in advance and with complete certainty the quantity and quality of material in the mineral deposit that is its main asset. This consideration is particularly true of metallic ores that occur in the form of veins, lodes, and thin lenticular beds, which cannot be evaluated far in advance of mining and which can come to an abrupt and unexpected end when a fault cuts off an ore body, a vein pinches out, or the metal content of the material declines sharply. Thus, the mining enterprise must deal with a wider margin of error or risk than many other types of enterprise.

3. The Accumulation of Metal Stocks.--The relatively imperishable nature of metals results in a constantly growing reservoir of scrap, or recyclable material, that substitutes for newly produced material and places a limit on the price to which new metal can rise before coming into competition with recycled metal. Theoretically, it is possible that the scrap, or secondary supply of metal, could supply much of the need for certain metals in a stationary economy.

4. The Peculiar Structure of Mining Costs.--A reasonable tax should have a minimum adverse effect on the economic operation of a firm. The structure of costs for a mining firm are somewhat different from those of nonmining firms primarily because decisions to continue or not continue operations under adverse cost and market situations are more complex. This is because the investment made in discovery and development of the ore body, as well as property purchases, plant, and equipment, are all sunk costs. These costs can be recovered only through continued extraction of ore. The salvage value of mine and mill plant and equipment is often low because each is tailored to the specific geological, mining, and processing requirements of a particular ore body. Mine entries and underground workings have little or no salvage value at all. Thus, there is a greater tendency to continue operations even though returns cover only the variable costs of extracting and marketing the mineral. These factors, along with relatively high shutdown and startup costs, contribute to a tendency toward continued overproduction when the market is contracting.

As in other industries, market demand determines the scale of mine operations. However, changes in commodity price and/or cost are significant in determining the life of a mine. An increase in market price permits mining of lower grade ore, expanding a mine's reserves. A drop in market price turns some ore reserves into unprofitable rock. As a consequence of the greater magnitude of fixed or sunk costs, the hazards involved in cost decisionmaking are

larger for mining firms. Mining firms are also subject to a sharp rise in the marginal cost of mining as workings are driven deeper and the grade and quality of the ore diminishes.

Operating costs of a mine are closely related to the unique characteristics of its particular mineral deposit. The method selected for mining and the decision on total tonnage to be recovered depend on factors such as grade, size, quality, depth, geographic location, homogeneity, etc., of the mineral deposit to be mined. A disadvantage in one factor, however, can be offset by advantages in another.

The scope of operations may vary from mine to mine. One company may carry on little more than a salvage operation on its present ore deposit with no effort to develop additional reserves. Other operations include development work on current reserves, and still others include exploration work to find entirely new sources of the mineral to be mined.

Use, Impacts, and Deficiencies of Taxes on Minerals

Mineral resources are generally seen by the public as the free gift of nature, the result of natural forces working over the ages and not the result of any labor, cleverness, or investment by man. This position is oversimplified because mining requires investment, labor, and acceptance of hazard and high risk. Nevertheless, there is an element of "economic rent" or "surplus value" in mining, an element of value that is inherent in the land itself over and above the value created by man's investment and effort. Theoretically, economic rent is a windfall profit, an unearned increment from a natural resource that can bear any level of taxation short of confiscation without discouraging use of that resource.

Another characteristic of mineral resources is that they are not replaceable. Once mined and consumed (apart from recycling), they are gone forever from the original deposit and can no longer yield income or tax revenue as structured at the beginning stages of production.

The characteristics above are the basis of taxing approaches to the mineral industry, of how to get the most revenue out of a resource that can be taxed but once and how to do this without being wasteful of a scarce and destructible asset. The question as to whether the mining industry may properly be singled out for special taxation is one that has engendered heated debate, notably in Minnesota (35).

The proponents of a heavy tax on minerals contend that (1) minerals are a gift of nature that should be shared by all; (2) because minerals once consumed are not renewable, society has only one opportunity to collect compensation for their removal; and (3) production of minerals is often by absentee owners who have little representation within the taxing jurisdiction.

The argument against heavy taxation of minerals is that (1) minerals are not the only gift of nature, so why treat them differently from surface land, individual talents, etc.; (2) minerals are of no value until someone makes the

investment of funds and effort to locate and produce them; (3) minerals do not disappear when produced but are converted into other products that can be taxed at several points; and (4) a high tax may discourage people from undertaking the risk that is involved in exploration and development of mineral deposits.

The deterrent and conservation impacts of a tax on minerals depend upon whether it is imposed on the surplus value of mining or becomes an element of cost. The difficulty is in distinguishing between those values created by nature and those created by man. It is generally believed that a tax on the net product, or net income, more closely taxes the surplus value involved. A tax that becomes an element of cost is more likely to reduce production, leave lower grade minerals undeveloped, and, if universally applied, be shifted forward to the consumer.

An evaluation of the tax burden on mining and its effect on mining decisions and production must consider all taxes. Although the emphasis here is on the severance tax, it seems useful to identify other taxes that are commonly imposed on mining firms so that some comparison of advantages, disadvantages, and applicability of each can be made. All States apply one or more taxes to all industries, including the mining industry. Some States impose no special taxes on minerals, some apply them only to selected minerals, and some apply them to all minerals. Severance or production taxes, and gross income or sales taxes, are the two major classifications of special tax on mining. Severance taxes are predominant and the only tax uniquely applied to extractive industries. Among the more general taxes that are applied, in varying degrees, to minerals as well as to all other industries are property taxes, income taxes, and sales taxes.

Property Tax

The property tax, which is almost always an ad valorem tax, is one of the oldest taxes and was probably the first tax on mineral property. For many years it was the principal source of State and local revenues, and it is still the exclusive domain of these levels of government. Several important mineral-producing States still rely on the property tax as the principal method of taxing mining; for example, Illinois and Pennsylvania which have no severance tax.

The general property tax is a levy on tangible property, real or personal, that is located within a given tax jurisdiction. It is a tax imposed on wealth, the capital value of a property rather than income. A value is placed on a mine for tax purposes, just as for any other industry, and then the local mill levy is applied. The amount of tax depends only on the assessed value and the mill rate. The property tax generally has been justified on the premise that ownership of property is an indication both of benefits received from government services and of ability to pay. Neither of these premises is necessarily true. The tax on property is based theoretically on the principal of uniformity, which is that each taxpayer, in this case property owner, should contribute to the necessary expenses of government in fair proportion to his wealth, and that all property would be treated alike regardless of type. The tax would be uniform horizontally within each property classification and

vertically between classifications. In fact, State constitutions generally require uniformity in application of the property tax. Although property is the basis of assessment, the tax has some elements of an income tax because it is anticipated that the tax will be paid out of income from the property while the property itself remains intact.

Advantages of the property tax are that it is stable over time, providing the assessed valuation and mill levies remain unchanged; it has been an adequate revenue producer in jurisdictions where mining production is large, as for example in the iron range areas of Minnesota where income from property taxes on mining property became extremely high requiring State action to prevent local excesses. Particularly relevant to today's prospects of massive development of coal resources in relatively underdeveloped areas is the fact that a property tax begins producing revenues immediately after the property is assessed. It does not require years of waiting for production to begin or build to a full production level, while the local government is in need of revenues to meet the increased demand for services by a greatly increased work force doing development work.

The property tax has inherent disadvantages that make it difficult to apply to mineral properties and that are responsible for its decline in use for that purpose. The most formidable of these is determining fair appraisal values. Making fair, accurate, and uniform appraisals of property to be taxed is the heart of the property tax. It is a difficult task for any property; in the case of mineral deposits whose extent and value are largely hidden, the uncertainty and likelihood of error are magnified many times. In practice, nearly insurmountable problems stand in the way of assessing mineral deposits at full, true, or fair market value. The deposit, which generally represents the primary asset of a mining enterprise, is below the surface of the ground, perhaps at considerable depth, and irregular in shape and grade. Exploration and preliminary development may give some indication of grade and size, but such evaluations are usually general and are not conducted very far in advance of mining, thus seldom providing more than a sample of the mineral deposit.

One widely used means of determining the market value of a particular piece of real estate is to compare it with similar properties that were recently sold. Unfortunately there is no organized market for mineral properties nor could one be devised that would provide comparative sales values upon which appraisals might be based. Differences among mineral deposits, even of a similar type, are in themselves great, and the actual total quantity of mineral in a deposit is not known until it has been mined out. The amount mined out and its value depend in part upon the amount of capital invested in the mine, future extraction costs, and mineral prices that change unpredictably. As a result, the valuation on which ad valorem or property taxes are based is largely based on personal judgment that causes considerable disparity between taxing jurisdictions and between the tax treatment of individual deposits, which are likely to be either overvalued or undervalued.

The particular problems that are encountered in applying the property tax to mineral properties, especially in the valuation, have led local governments to apply a variety of techniques.

1. Use of Annual Income or Proceeds as a Substitute for Total Value.--Assessing mines for tax purposes on the basis of income or proceeds from production can be used to avoid the difficulties of mine appraisals altogether. The tax mill rate is simply applied to the annual income of a mine or some portion thereof. This solution still leaves multiple choices to be made as to whether more reasonable results are achieved through (1) the use of net or gross income for the preceding year, (2) an average for some period of years, (3) some fraction (multiple or combination) of net and gross proceeds, (4) at what point proceeds should be measured, and (5) what deductions are allowable to arrive at net proceeds. Applying the tax mill rate to the annual income may not be entirely in harmony with the underlying property tax philosophy of taxing full and true value because the value of a mineral deposit changes over time even when output remains about the same. Also, because the resource is exhaustible, some portion of income is actually a return of capital, not a return on capital. The tax becomes a tax on flow of wealth over time and not wealth in place at a given point in time. The rationale that the income from a mining operation over a period of time is equal to the sum of wealth in the deposit is not entirely true. The application of a given mill rate to income may well result in a lighter tax burden than if it were applied to the value of the mineral deposit providing this value can be determined. A mining property not in production would need to be assessed by some other means.

Assessment based on income gives a relatively high degree of certainty of tax base, and administration of the tax is simple, economical, and convenient to administer as long as the taxpayer keeps good records. Because of such advantages, this method of assessing the value of mineral properties has been widely used.

2. The Hoskold Formula.--This is a mathematical solution to assessing the present worth of a mining property. It is based on the expected annual income from a mine which is derived from estimates of reserve tonnage, rate of mining, cost per unit, and expected profit per unit); years of life of the deposit; and a practical, safe rate of interest on capital investment. Given these values, the Hoskold formula permits an exact solution to present value. The difficulty, of course, is in making estimates for each of the elements in the formula. Herein lies the controversy over the usefulness of this formula. On the one hand, it provides a method that is theoretically rational, readily available, and reduces some of the arbitrariness of having no organized guidelines at all. Because it yields at least a token tax even when a deposit is not being worked, it provides some stability of tax revenue. On the other hand, depending as it does on estimates of tonnage, grade, and rate of production, the Hoskold formula can produce inconsistent results. Some of the uncertainties of its use could be diminished through a statewide and uniform system of appraisal, but then the administrative costs would be high.

3. Negotiation.--Negotiation between the mine owner and the assessing official is an arbitrary way of arriving at an assessed valuation to which the property tax can be applied. This method requires little or no technical information about the mineral deposit under consideration or its mining prospects, relying largely on the integrity and individual strengths of the negotiators; the resultant assessment thus depends on the relative bargaining

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power of the two. It does allow for a high degree of flexibility in assessment and a very economical administrative cost.

4. Token Assessment.--Because of the difficulty of determining full value for a mineral operation, some taxing jurisdictions content themselves with imposing a property tax on the surface improvement and equipment of a mine, plus a token tax on each acre of surface property occupied by the mining operation.

In addition to determining a fair appraisal value, a second major problem in applying the property tax to mineral deposits is whether it encourages accelerated mining of a deposit and consequently inefficient and incomplete recovery of the resource. The argument against the property tax is as follows: The tax applies whether a mineral deposit is mined or not. This encourages or forces the owner to begin production as soon as possible. Increased production leads to a decline in price. The decline in price raises the cutoff grade of ore that can be profitably mined, encouraging selective mining of higher grade ore. Consequently, a smaller amount of the ore is mined out before a mine is abandoned.

The property tax imposed on a mineral deposit in place requires payment on that part of the resource that will not be extracted for years as well as that portion that will be extracted in the current year, even though the mine operator receives income only from the portion extracted and sold in the current year. An annual property tax is levied and collected each year on ore that may not be mined for many years, although income is produced from the ore only once. A tax burden accumulates on minerals that will not be mined for years and on mines that are currently unproductive or in a development stage of operation. Thus, the ad valorem property tax would seem to encourage early, rapid, and incomplete mining of a mineral deposit and discourage measuring and valuing reserves very far in advance of current production. Its effect indeed may be to shorten adversely the period of mine operation; discourage orderly exploration, development, and mining; cause overdevelopment of mine capacity by forcing mineral property owners to open mines to produce income to pay the tax; encourage selective mining with the accompanying loss of lower grade material; in short, to encourage the mineral property owner to "mine out from under the tax."

Just how serious these effects of the property tax are, of course, depends upon how large the tax is. If the tax is a relatively small portion of total cost, as is generally the case, it will not weigh overly much in a mineral property owner or mine operator's decisions on whether or not to mine and at what level and rate.

Finally, the property tax may result in interregional and interfirm inequities as methods and levels of assessment and tax rates differ from county to county and State to State.

Despite its shortcomings as applied to minerals, the ad valorem property tax is so well established and important a part of local government revenue systems that it continues to be widely used in one form or another.

Income Tax

In addition to the Federal income taxes levied on mining companies, about three-quarters of the States apply a State corporation income tax to mining corporations as well as other types of corporations. Rates vary among States but generally are on the order of 5 to 6 percent after deduction of the Federal income tax. In some States, companies taxed under special taxes may be exempt from the State income tax. In other States, both special taxes and State income taxes are applied. State income taxes are based on net income, which permits deduction of ordinary business expenses such as wages, salaries, supplies, etc. In addition, mining firms can deduct a Federal depletion allowance that varies by mineral commodity.

The depletion allowance, which is perhaps the major issue in mineral taxation, is a provision for the return of investment because in the process of mining a firm's primary asset, the ore body or oil reserve, is consumed and is not replaceable. Although the rationale of the depletion allowance is to permit a wasting-asset industry to recover its investment, the rate of depletion is usually not calculated on the amount of the investment, but rather as a percentage of annual gross income from mineral production. A number of different methods are utilized in computing this allowance including cost depletion which gives a reasonable allowance on the cost of the property, and percentage depletion based on a percentage of gross or net income from the property. The percentage depletion is the most widely used method because it is simpler and apparently results in a more generous deduction. The percentage depletion, however, goes beyond the recovery of investment because if a mine continues to yield a profit after the full value of investment is recovered, the deduction still can be claimed.

The depletion allowance also may confuse capital gains and mining income (at some point a mineral deposit could become a mining firm's inventory used in production rather than its capital). Because the depletion allowance is intended to be an incentive to encourage the enterprise and risk required in mineral exploration, the point often is raised that this might be better done through market price than through preferential tax policy. Also, exploration and development expenditures are deductible from income before taxation in amounts and by methods that vary among the States.

It can be argued that an income tax that allows deductions for such items as costs, depreciation, and depletion, is perhaps the soundest way of taxing the mining industry. It has the least effect upon costs until the break-even point is reached. Because it is not an added cost, an income tax does not affect the cutoff grade or reduce ore reserves. It may even encourage exploration and development of future reserves since these costs can be deducted from gross income, reducing the tax to be paid. An income tax does not penalize a mining operation during periods of economic or labor difficulty, it is relatively easy to assess and collect, and it is equitable in being based on ability to pay.

On the other hand, there is some concern over whether an income promotes inefficiency in operation since the higher a firm's costs and the lower its

net income, the less tax due. This could penalize the more efficient firms and subsidize the less efficient. The principal disadvantage of a tax on net income is the uncertain yield that varies with individual company results and the vicissitudes of the minerals markets.

Production Tax

A gross production tax is levied on the dollar value of total production. Gross production also may be used as a base for the ad valorem severance tax. When this is the case, there is little difference between the two taxes except the name; in practice the two names are used almost interchangeably with taxes that are severance taxes in intent enacted under both names. Gross production taxes (and occupational gross income taxes and sales taxes) on mineral production differ from the severance tax in that they are always on income, whereas a severance tax may be imposed on volume of production as well, and there may be a significant difference between minerals mined and minerals sold. A tax based on the value of gross production has some advantages over one based on physical production. It is more equitable in periods of rapid price change because it rises and falls with income to the mining firm. It also recognizes differing qualities of ore, greater or lesser value in the same physical volume, and hence differences in ability to pay. This means it also may be less likely to raise the cutoff grade because the tax decreases with the value of production or with the grade of ore. This tax, therefore, would encourage more complete recovery of the mineral resource than a tax that did not vary with value of production.

Although revenues to the State increase as mineral prices increase, it is also true that revenues decrease as mineral prices decrease, which may well be when the State needs the revenue most. Administering a gross production tax may not be as straightforward and simple as it would seem because sales prices are sometimes difficult to determine, as in the case of captive mines whose product is consumed by another activity of the same company.

A net production tax is closely related to an income tax and has many of the same advantages and disadvantages. It has a minimum effect on the level and rate of mining. Because the net production tax is imposed on income after deduction of production costs, it does not discriminate against lower grade ore, nor does it impose a burden on the exploration and development phases of mining. It is closely related to the principle of equity in ability to pay, and permits progressivity of rates, although the degree of equity depends somewhat on whether deductible costs include all relevant costs. It poses some administrative difficulty in the verification of deductions and, because of fluctuations and uncertainties in net income, may be neither an adequate nor reliable revenue producer. As with the income tax, there is a question as to whether the net production tax rewards the inefficient producer.

NATURE AND BACKGROUND OF THE SEVERANCE TAX

Definition of Severance Tax

The term "severance tax" is commonly used to describe special levies on the production of natural resources. They are largely a development of the

past 60 to 70 years, and they have been used to prescribe special treatment for mining, to derive additional tax revenues from mineral resources, and for mineral resource conservation purposes. Unfortunately, there seems to be no clear-cut, universally accepted definition of a severance tax. A tax is not a severance tax simply because the legislation establishing it labels it as such. Nor is it a severance tax because it is imposed on an industry engaged in the extraction of natural resources. Not all taxes imposed on mining, for example, are severance taxes, but may be property, income, or sales taxes or an assessment for regulation and not actually based on severance.

On the other hand, such fees as license taxes, that ostensibly apply only to the privilege of doing business, may in reality be severance taxes. Identical taxes may be given different names by different States for political or administrative purposes or because of perceived legal implications. For example, Montana has a Metalliferous Mines License Tax, a Micaceous Minerals License Tax, an Oil and Gas Conservation Commission Tax, and a Mineral Mining Tax as well as a Coal Severance Tax and an Oil and Gas Producers Severance Tax; Utah has a Mining Occupation Tax; Texas has Oil Production, Natural Gas Production, and Sulfur Production Taxes. All of these are severance taxes. Only about one-quarter of State taxes that are considered severance taxes are actually titled "severance" taxes. The legal designation usually represents simply a means of adding a new tax into the taxing system of a particular State.

The severance tax is distinguished by its relationship to the actual removal of the natural resource. The severance tax is not imposed upon the mineral itself as would be a property tax, but upon the removal of the mineral. Property taxes based on the annual gross or net proceeds of mines are sometimes, confusingly, called severance taxes, but are actually a method of arriving at an assessed valuation of a mine to which the applicable mill levy is applied. The severance tax, however, may be imposed in lieu of the property tax in an effort to equalize burdens on other types of property. Although severance taxes are discussed here almost exclusively in terms of taxes on the extraction or severance of minerals, severance taxes may be and are applied to the extraction of other natural resources such as timber and fish. The preponderant use of the tax, however, is in connection with mining of mineral resources. The rationale set forth for the tax seems to apply better to nonrenewable natural resources, such as minerals, than to renewable natural resources. It has never been applied to agricultural crops. The distinctive character of the natural resources involved has given rise to particular taxing problems which the severance tax was developed to solve.

The legal designation of State taxes on minerals is generally based upon (1) granting the privilege of extracting a mineral from the ground, that is, a privilege or occupation tax, the privilege to do something rather than just to exist as is the case with a franchise tax; (2) the legal device through which that privilege is granted, such as a license; (3) the intended economic effect of the tax or the purpose for which the revenue raised will be used, such as conservation; and (4) the mineral upon which the tax is imposed, as in the Coal Tonnage Tax in Colorado. Most of the taxes on mineral resources appear to be based on the privilege or occupation of extraction. Because courts have generally treated severance taxes as excise taxes paid for the privilege of

mining and not as property taxes, severance taxes are not subject to a State's constitutional requirements of uniformity that property taxes are, and if they are imposed in addition to property taxes rather than in lieu of them, it is not considered double taxation.

Although a severance tax may be called an excise, license, privilege, production, or occupation tax, and the name may have legal importance, it is the economic effect of the tax that is of major interest. The rate and measure (or base) of a tax are its two major economic components. The base or measure of a severance tax is of two principal types: (1) The physical volume of production; and (2) the annual value of production, either gross or net value, both usually measured at the time and place of extraction. The economic definition of a tax appears to be determined largely by the base (or measure) upon which the tax is imposed. Thus, in an economic sense, a severance tax appears to be any levy (with given statutory rates to distinguish it from the property tax based on mine production) on natural resources, the measure of which is the volume or value of the natural resource produced. The definition of severance tax now used by the Bureau of Census is, "Taxes imposed distinctively on removal of natural products--e.g., oil, gas, other minerals, timber, fish, etc.--from land or water and measured by value or quantity of products removed or sold" (38). One author on mining taxation (36) calls the severance tax, which is levied as a specific amount per physical unit of production and has no tie to the value of the product mined, the "true" severance tax. The question of definition can be overstated. The many variants of the severance tax are attempts to meet the problems of mineral taxation in different ways.

Nature of Severance Tax

In most States, severance taxes are applied only to specified mineral industries, such as oil and gas production or coal or iron mining. In some States, the tax is imposed on every firm severing a natural resource from the soil or water. The tax is usually paid by the producer, but in a few States payment is made by the first purchaser.

Imposition of the tax on a producer occasionally raises the problem of what specific point in the process production took place. Generally, separating the mineral from the ground constitutes production of the mineral, but for some commodities in some State statutes separation, milling, refining, or finishing the product are necessary before production has taken place. In common usage, any tax imposed on mineral production is called a severance tax regardless of when it was imposed during the mineral process.

Severance taxes are based upon either the value or the physical volume of the minerals produced. "Value" is usually defined in terms of market value, although in some States gross value is the basis of the tax while, in others net value or proceeds is the base. Net value is calculated by deducting certain items, such as specified costs of production, ad valorem taxes, royalties, and, in the case of gas wells, the losses from evaporation, and gross value.

The severance tax is generally imposed as a fixed percentage of the value designated or a flat rate per unit (ton, barrel, thousand cubic feet, etc.).

However, the tax may be graduated according to the value of the mineral produced or the quantity of production, or, as in the case of the Montana Coal Severance Tax, on the British thermal unit content of the coal produced and with different schedules applying to coal produced by surface mining methods and underground mining. In Ohio, the tax rate is based on the sulfur content of the coal delivered. In some States, both a value and a unit base are stipulated with whichever produces the highest revenue pertaining in a specific instance.

Some analysts have attempted to classify severance taxes on the basis of the features discussed above. A severance tax may be classified as general, that is, applied to all natural resources within the taxing jurisdiction; or it may be selective, that is, applied only to a specific mineral. Minerals taxed are generally those that are, have been, or are expected to be of importance in a particular State. Different minerals may be treated by separate statutes within a State. A severance tax may also be classified on the basis of its imposition, that is, if it is in lieu of the property tax or in addition to the property tax. It may also be classified on the type of base or measure used; for example, rate per tonnage, gross proceeds, net proceeds, or gross income.

Firms responsible for payment of severance taxes are required to file reports, usually monthly, giving all information required to calculate their tax liability. If a taxpayer fails to file such a return, a tax administrator is empowered to examine the taxpayer's records and, based on information he can gather, make an assessment of the tax. Payment of the tax is usually required with the monthly report. Some States provide for different reporting and paying periods, such as semiannual or annual reports and payment within a stipulated period after the report is due.

Origin and Historical Basis of Severance Tax

Most severance taxes are occupation or privilege taxes. Occupation taxes descend from the very earliest commercial times when a king or other authority became aware that an occupation was a source of wealth from which a tribute could be exacted for its safe and continued pursuit. Privilege taxes had their origin when a ruler granted certain favorites the right to pursue economic activities, which were part of the royal prerogatives, in return for a share of the profits.

Application of the occupation and privilege concept of taxation to mining can be traced back to early times when mines were the property of the State, as with the gold and silver mines of Greece and Rome that were worked directly by State slaves. During the Middle Ages, European countries frequently held that all mines yielding gold and silver were the property of the Crown. A good example of the practice of vesting title to mineral deposits in a State is seen in the Spanish tradition of "utilidad pública" (for the public good). Such royalties appear to be one forerunner of the severance tax principle. Another justification of this principle is found in the theories of the "physiocrats," a French and English school of economic thought that developed toward the end of the 18th century, which held that the ultimate source of all

real wealth lies in natural resources, and that no single individual or generation had the right to exploit natural resources which belong to all citizens of the country and to posterity; that exploiters of natural resources should reimburse society for its loss of resources through a severance tax. Thus, although exploitation of natural resources was carried on by private enterprise, a severance tax was paid to the government acting on behalf of the people.

The well-established property tax was applied to the production of minerals in the early United States. In 1846, Michigan departed from the common practice of applying only the general property tax to mines by levying a specific tax of 4 percent on the product of all mines. This was in lieu of all other State taxes. The first tonnage tax law was imposed by Michigan in 1853 on coal, iron ore, and copper ore. Although several other States experimented with severance taxes on minerals, most of the early departures from ad valorem real property taxes were isolated cases. Not until after 1920 did other methods of taxing mineral resources become popular, despite the problems of assessing ore deposits to apply property taxes. Even though seven States had severance taxes by 1910, the severance tax was then seen more as a measure of encouraging mining by giving it special tax treatment than as a means of raising revenue. It was not until the 1930's that the States more generally entered the excise tax field to meet revenue requirements of the Great Depression, and special taxes were levied on minerals for conservation purposes. The most common taxes on mineral resources were those based on gross or net value or volume produced in an effort to get away from the mine assessment problems. Several States shared their severance tax revenues with local government in the 1915-30 period. These shared revenues were generally specified for schools or roads.

The Federal Government also has imposed taxation on minerals through output taxes, mining licenses, corporate excise taxes, various income taxes, and special purpose taxes such as that imposed to assure reclamation of mined land. An income tax in 1861, an output tax in 1862, and a special excise tax in 1909 were among notable Federal taxes on minerals. The income tax of 1913 superseded other Federal taxes on minerals. The severance tax has remained a State tax, although a number of States also permit county governments to impose a severance tax.

RATIONALE OF THE SEVERANCE TAX

The purposes or rationales for imposing severance taxes are numerous and varied, ranging from the more imposing clarion calls for "conservation of resources" and "taxing equity" to the more down-to-earth justifications of simple political convenience and the need for more revenue by States. Arguments made for and against use of the severance tax give the ostensible reasons for use or nonuse of the tax by a particular State; real motives may not always be so readily apparent.

Underlying the current substantial interest in and use of severance taxes is the increasing responsibility of State governments to provide expanded programs of government services and the attendant increasing revenue need, the

increased public awareness of the minerals industry due to rising energy and mineral needs and related environmental concerns, and the adaptability of severance taxes to fit the special conditions involved in taxing minerals.

Advocates of the severance tax claim that among other advantages the severance tax compensates the public for exploitation of its mineral heritage; that it promotes mineral conservation; that it is a productive source of revenue; that it taxes absentee owners who have large profits and preferential Federal tax treatment; that it is administratively convenient, economic, easy to collect, and difficult to evade; that it pays for the environmental, social, and economic costs associated with mining; and that, because it is a statewide tax, it is more equitable to both the mining operations that pay it and to the localities that share in the proceeds.

Opponents of the severance tax allege that it discriminates against the mining industry, impairing its ability to compete with other industries; that by raising the costs of production, it has an unfavorable impact on mineral development and conservation; that it is unstable and unpredictable; that it raises problems of intergovernmental relations, making in-State operations less competitive with out-of-State and foreign operations; and that it works against the national policy of decreasing energy dependence on foreign sources.

The arguments that are made in favor of the severance tax and the criticisms against it require further examination. The following discussion of the arguments for and against the severance tax are not in order of importance or validity of argument. The validity of points made for and against vary largely with the particular circumstances. In many cases the same arguments appear to be made both for and against the severance tax, depending upon the point of view of the person presenting the argument.

Arguments in Support of the Severance Tax

1. Protects the Natural Heritage of the Public.--Because mineral deposits are a bounty of nature rather than manmade, there is a popular feeling that they are the natural heritage of all the people of the Nation. Because mineral deposits are exhaustible and nonrenewable, future generations also have an interest in their use.

Therefore, the argument runs, no individual or group of individuals has the right to exploit mineral resources for private profit without compensating the rest of society for using what is the natural heritage of all (little recognition is given to the fact that society is the ultimate user of the minerals produced). This argument taps a latent sense of national proprietorship or joint ownership of natural resources. The severance tax is seen as a means of directly tying payment to society to the extraction of a natural resource. Some proponents of this argument would put receipts from the severance tax in a trust fund, the income from which would be used to build schools, hospitals, highways, etc., that would serve future as well as present generations.

The argument that nonrenewable natural resources are the heritage of all the people has considerable popular appeal and is one of the leading claims

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used by advocates of a severance tax. However, it is hard to justify in a free enterprise society that is based upon private ownership of land and other types of productive capital. The argument can be criticized as an improper assertion of a royalty interest in mineral resources that the States do not have; mineral resources, like most other resources, largely have been acquired and developed by private capital and are, therefore, out of the public realm.

2. Taxes Absentee Ownership.--Minerals are most often found in isolated, relatively undeveloped areas. As a consequence, the exploration and development of minerals deposits, financing and purchase of plant equipment, and management of the mining operation are likely to be done by nonresident individuals and corporations. Much of the profit from the enterprise flows outside the area leaving little or no permanent wealth in the State or area in which the mineral deposit occurs to compensate for the natural resources removed. There is a general public suspicion of and dislike for absentee owners. In addition, it is often believed that absentee owners largely escape the local tax burden. All these feelings are heightened when it is believed that the absentee owners are also making large or even excessive profits as is often felt about the mining industry. Where this is the case, a special tax on mineral severance has considerable appeal to the inhabitants of the area in which the mining takes place, not only as a means of putting the burden on outsiders but as a matter of equity in distributing the tax burden.

Actual shifting and incidence of a particular severance tax is uncertain, depending upon the market structure, elasticity of demand, pricing policies, taxes elsewhere, and whether the base upon which the tax is levied is gross value, income, or physical volume of production. There is, however, a strong likelihood that at least part of the burden of the tax is shifted to outside purchasers. Regardless of what portion of the tax is shifted backward to the local mine labor force, forward to purchasers and users of the mineral taxed, or remains with the owners of the mining enterprise in the form of a lower rate of return on investment, the incidence of the severence tax is likely to rest with an absentee interest.

Politically, taxes on mining interests also can be attractive. Absentee owners may have little influence in the local State legislature; the political balance of power runs against rural areas in which most mineral deposits are found and in favor of urban areas that are more likely to favor taxing the mineral interest.

3. Equalize the Tax on Mining.--Owners of mineral resources are generally believed to receive preferential tax treatment under both local property taxes and Federal and State income taxes--property taxes because of the difficulties inherent in determining the extent and value of a mineral deposit generally are thought to result in undervaluing and underassessing mineral properties; Federal income taxes (and hence most State income taxes) because of depletion allowances that can be deducted from income before calculation of the tax. The severance tax is a means of compensating for beneficial treatment under these other taxes and making mining bear its "fair share" of the tax burden. Using a severance tax to equalize the distribution of the total tax burden between mining and nonmining enterprises assumes that the

distribution of that burden is known, which may not always be a reasonable assumption. An extension of this theory is that a mineral may be shipped out of the State of origin in an unprocessed condition, which means lower taxable value in the originating State. A severance tax may overcome this deficiency. Whether application of an additional tax, specifically a severance tax, is preferable to correcting the shortcomings of existing taxes on mineral resources is questionable.

4. Revenue Productivity.--An important requirement of any tax is that it produce revenue. The severance tax can produce considerable revenue for any State with mineral resources. The amount of potential revenue depends, of course, on the mineral endowment of a State. The severance tax has been of major importance as a source of revenue in Texas and Louisiana and, as seen in tables 2-3, it is of significance in perhaps half a dozen other States. Mineral deposits cannot be moved out of State to escape taxation, although too burdensome a tax certainly could affect decisions on whether to mine or not.

5. Mineral Resource Conservation.--Given market demand, in one sense conservation in mining is the extension of the economic life of a mineral deposit by decreasing the rate of recovery and/or increasing the level of recovery without the uneconomic utilization of other resources.

Most taxes have some effect on the willingness of an individual or firm to undertake an economic act. In mining, a tax may tend to encourage conservation, accelerate depletion, or have neutral effect. If conservation of a mineral is thought to be a worthy goal, then a tax that encourages conservation or is at least neutral would be preferred to one that discourages conservation. One of the arguments advanced in favor of the severance tax is that it can promote conservation. The severance tax (based on per unit extracted or on gross value) is an added cost of production. By placing the greatest tax burden on the actual production of a mineral, it restrains excessive production, conserving supplies for the future. It offers no incentive to hasten production to mine out from under the tax, as with the property tax, and is therefore comparatively neutral in regard to the timing of production.

However, on the contrary side, a severance tax as an added cost of production raises the cutoff grade of the mineral being mined, reducing the level of production, which means a greater amount of potential ore is left in the ground probably never to be recovered, and thereby diminishing conservation.

6. Administrative Ease and Convenience.--Administration of an compliance with the severance tax are relatively simple and economical and only a few taxpayers are involved. The relative simplicity of calculating the tax base, either production, sales, or income, avoids the evaluation problems associated with the property tax. If the tax is based on physical volume, evaluation problems are avoided altogether. It applies uniformly to taxpayers without possibility of over or under assessment. It is likewise difficult to evade. Miners can assess their own tax on the basis of information readily available in their records.

7. Mining Should Pay Costs of Regulation as Well as Environmental, Social, and Economic Costs it Creates.--Severance taxes have been supported as a means of providing for the special costs incurred by State governments in supervising, inspecting, and regulating the mineral industry; for example, safety inspection and enforcement of conservation and environmental protection measures. The severance tax in many States is nominal with the sole purpose of covering such costs. Of increasing concern today are the environmental, social, and economic costs associated with some large-scale mineral, especially mineral energy, developments. Such social costs of mineral production, it has been argued, should not have to be borne by the general taxpayer. Severance taxes are one way of internalizing these social costs which are external to the operation of individual mining enterprises.

8. Allows Statewide Sharing of Revenues From Mining.--High-grade mineral deposits are generally highly localized in occurrence. If taxed locally, as by a county property tax, the public benefits from tax revenues also are likely to be highly localized. If taxed by a statewide tax, such as a severance tax, public benefits can be distributed more broadly, including those localities without mineral deposits. This argument assumes that use or distribution of revenues received by the State is fair and reasonable. If severance taxes are in lieu of local property taxes, State reallocation of such revenues to the local governments is even more critical.

9. Is Better Than Its Alternative, the Property Tax.--The alleged deficiencies of the property tax as applied to mineral properties have been discussed at some length in this study. It is argued that use of the severance tax avoids the inaccuracies, inequities, and wastefulness of resources that are inherent in use of the property tax; this is especially true if the severance tax is imposed in lieu of the property tax. The severance tax more closely adheres to the taxing principle of ability to pay because it applies only when production takes place. The severance tax encourages more rational development of mineral resources than the property tax and may be generally less burdensome to the industry.

10. Is an Established Means of Revenue Collection.--Severance taxes have been applied successfully to minerals for many years. They have withstood numerous court challenges. They are, therefore, an available and proven means of taxing minerals. In this same vein is the practical argument that the severance tax is an additional source of revenue available to States that are not already using it.

11. Can be Used to Discourage or Delay Unwanted, Mineral Activities.--In this day of environmental, social, and economic concerns pertaining to overdevelopment, and acceptance of public planning, the severance tax can be and has been used as a tool for controlling development of mineral resources.

12. Shifts Burden to Consumers in Other States.--This argument is related to the absentee owner arguments in that it suggests the opportunity of passing a tax burden on to others. If the burden of the severance tax ultimately lies with the consumer, then out-of-State consumers end up paying it. If State A imposes a severance tax on minerals consumed in State B, the taxpayers-

consumers in State B are paying severance tax to State A, which puts them at a disadvantage relative to residents of State A. Institution of a severance tax by State B can appear to taxpayers of that State to be a matter of simple equity.

Arguments Against the Severance Tax

1. Unfavorable Impact on Resource Development and Production.--One of the most serious criticisms made against the severance tax is that it has an unfavorable impact upon resource development in that it discourages investment in mineral production and consumption of mineral products by raising production costs. A severance tax, like any tax based on cost, would raise the production cost of minerals by the amount of the tax. One question seems to be whether this poses a disproportionate or unequal burden as applied to the mineral industry. The answer seems to be that there is no reason why the impact of severance taxes on mineral development should be any greater than that caused by any other tax if reasonably imposed and administered. Any increase in cost is normally recovered through increasing price, assuming the incidence rests upon the consumer. Producers of minerals that are traded in world markets, however, are generally price takers, not price setters, and are not able to individually raise the price of their product.

The impact of an added cost obviously will be greater on the marginal or high cost producer, although it does not change his relative position in the industry if the tax is applied to all producers. A severance tax based on net income certainly would be less burdensome to the less profitable producer, whereas a per unit tax that does not vary with cost tends to work against the less profitable producer. It is debatable, however, whether tax policy should be based upon protecting the marginal producer.

2. Is an Unsuitable Alternative to the Property Tax for Local Governments.--This argument contends that the severance tax is an unsuitable revenue alternative for local governments for several reasons. First, because the severance tax is based upon production, revenue from it can be both unstable and unpredictable since the rate of production can vary considerably. There is no "normal" rate of production because production varies with market conditions, labor strikes, etc. Hence, local governments cannot rely on any stable amount of revenue upon which to budget expenditures.

Second, in a State-collected, locally shared tax there may be administrative problems in distribution formulas, that could strain intergovernment relations. If the severance tax is imposed in lieu of the property tax, local governments could lose their financial independence, becoming more dependent on the State, which would affect the system of division of powers.

The point that severance taxes are unstable and unpredictable may not have a serious effect in many cases. Even where there is a sharp decline in severance tax revenue in a given year, a State may be able to makeup the difference to local governments from other sources because revenue from severance taxes is a small share of the total in all but a few States.

3. Handicaps Conservation of Mineral Reserves.--The severance tax is an addition to cost. With a given market price, and a higher production cost, the mining firm will have to mine higher grade ore to remain profitable. Thus, the effect of the severance tax is to raise the cutoff grade of ore mined. Marginal grades of ore formerly recovered become waste and are not now mined; reserves are correspondingly reduced. An amount of lower grade mineral is irretrieviably lost as the result of a severance tax.

4. Discriminates Against the Mining Industry as a Group.--Because the severance tax singles out the mining industry for special taxation, it is discriminatory taxation that puts the mineral industry at a disadvantage relative to other industries. The effect of a severance tax would not be neutral in terms of the mining industry's ability to compete with other industries for labor and capital.

5. Promotes Inequalities Within the Mineral Industry.--Relative to the two preceding arguments, it is contended that a severance tax based on gross proceeds or gross production discriminates against the high cost producer. Because high unit cost production is frequently associated with the nature and quality of mineral deposits, a severance tax may discourage development of the more abundant but low-grade resources or those deposits more amenable to underground rather than surface mining technique. A per unit severance tax also would discriminate against low-grade ores inasmuch as it would represent a higher percentage of value than the same tax on the same unit of higher grade ore. The burden of a per unit tax will decrease if market prices increase and increase if prices decrease. The burden of a tax based on value produced would remain more constant as prices and the related tax payments change.

If a severance tax is imposed by one State but not by another, interregional inequities in competition in mineral development could result. Similarly, if a severance tax is imposed on selected minerals but not on other minerals within the same taxing jurisdiction, an intercommodity discrimination within the mineral industry develops.

6. The "Natural Heritage" Theory has no Legal Foundation or Other Substance in a Free Enterprise Society.--The idea that minerals are a gift of nature and part of natural heritage of all, and that therefore anyone removing them must pay society for them, is an argument put forth for imposing a severance tax. A number of counter arguments have been offered:

Minerals are not the only gift of nature. Such things as farmland, sought after real estate sites, certain water resources, even unusual individual talents are also gifts of nature to which the natural heritage theory could as reasonably be applied.

There is no legal foundation or tradition in our free enterprise system for the natural heritage theory. Natural resources in this country traditionally have been appropriated and developed by private individuals and firms. As a matter of public policy, private development of minerals on public lands has been encouraged by permitting entry onto and location of mineral claims on Federal land.

Federal tax incentives such as depletion allowances have been offered to encourage private development of mineral resources.

In imposing a severance tax on mining, States are asserting a royalty interest in property to which they have no valid claim.

Mining companies pay their way in the areas in which they operate in a number of ways. Creating employment, increasing sales demand for a wide variety of goods and services, and establishing other business opportunities all, in due course, contribute to the tax revenues of the area. This point also is made in refutation of the "tax the absentee owner" argument for severance taxes.

Mining is usually a speculative venture facing greater risk of loss than most economic activities. Without the investment and risk taken by miners, minerals would not be extracted and processed into a useful form. The very existence of a mineral deposit generally is not known until an individual or firm has invested in exploration, proving them to be of commercial quality. Minerals, therefore, are not a valuable resource to an area or nation until they have been discovered and mined.

Finally, minerals are not irrevocably lost or destroyed when they are removed from the earth, but are transformed into materials and goods that form a chain of taxable economic wealth and activities broadening a State's tax base and economic well being.

7. Effects of a Severance Tax are Contrary to the National Policy of Decreasing Energy Dependence on Foreign Sources.--The major portions of all revenues accrued under severance taxes in this country have been from petroleum and gas production. Coal production is the target of much current severance tax legislation, including Federal legislation, to provide for reclamation and health benefits. To the extent that they do discourage mineral development and production and to the extent that they do restrict production of lower grade minerals, severance taxes would, this argument states, work against this Nation's goal of decreasing energy dependence on foreign sources.

8. Feasibility of Ad Valorem Property Taxation.--Some opponents of the severance tax believe that the deficiencies of the property tax as applied to mineral taxation have been over emphasized, that appraisal and the problems discussed previously can be overcome.

9. Automatic Inflation.--To the degree that a tax is passed on to consumers through an increase in price, it is inflationary. Inflation of domestic price makes the domestically produced mineral less competitive in the international mineral markets.

As indicated in the foregoing discussion, the validity of arguments both for and against the use of a severance tax depends to a great extent upon specific characteristics of the particular severance tax proposed and of the mining industry to which it will be applied. It depends upon the level of

mining industry to which it will be applied. It depends upon the level of rates, the base to which applied, the cost structure, and other conditions of each firm affected. Some of the effects claimed, both for and against severance taxes, are true or significant under some conditions but not true or significant under others.

On the question of a proper basis for severance taxation, for instance, it can be argued that a gross proceeds base, contrasted with net proceeds or gross income, is preferable because it establishes the tax at the point of severance, provides a high yield, and is simple to establish and administer. Conversely, it also can be maintained that such a base makes no allowance either for ability to pay or the extractive costs of individual operators and would force mine operators into the resource-wasting practice of high-grading. Moreover, it also can be claimed that a per unit basis favors mines working high-grade ores while a value based tax is more easily borne by low-unit cost operations. Therefore, the question is not only severance tax versus some other form of tax, but what kind of severance tax as well. Tax policies are likely to be determined ultimately more on the basis of political considerations than on economic effects. The motivation for severance tax legislation appears to center around four objectives: (1) revenue, (2) conservation of mineral resources, (3) replacement of local property taxes on minerals, and (4) shifting the burden of taxation to residents of other States.

Legal Aspects of the Severance Tax

However suitable a tax may be in its economic, administrative, and political characteristics, it cannot be used unless it can withstand legal challenge. Severance taxes are legally defined as excise and/or occupation taxes or licenses rather than property taxes, and as such, with a few exceptions, have been held to be legally valid by numerous court cases. A license grants a person the right to do something that he might not otherwise legally do. A license tax is the charge made for the right granted by the license. In the case of the severance tax, this is the right to sever or extract specified minerals from the earth.

License taxes and occupation taxes have been distinguished from one another legally on the basis that the license tax is primarily a means of regulation while the occupation tax is generally designed to raise revenue.

Much of the legal question surrounding the severance tax has concerned its relationship to the ad valorem property tax. Courts generally have held that severance taxes, as occupation or privilege taxes, can be imposed in lieu or in place of ad valorem property taxes and neither constitute property taxes nor be considered a substitute for them on the minerals involved. Severance taxes levied in addition to the existing property taxes on mineral property have been upheld as taxes on the privilege of severing the mineral even though they are measured by the value of the property severed and are not duplications of the property tax.

Legal objections to the severance tax have centered around claims that it violates the Constitution in a number of ways (9).

1. It violates the interstate commerce clause by imposing a hinderance or unreasonable burden on the movement of goods between States.

2. It violates the due process clause imposing double taxation when levied in addition to property taxes.

3. It violates the equal protection clause in being arbitrary and unfair discrimination against the mining industry.

4. It breaches the validity of contracts when it taxes nonproducer royalty interests.

The interstate commerce clause of the Constitution prohibits States from interfering with goods moving in interstate commerce. Because the product of many mines and wells is shipped directly to other States, it is questionable whether a severance tax imposed on this product by the State in which it was extracted imposes a burden on goods in interstate commerce.

In 1923, the U.S. Supreme Court ruled that mining is not interstate commerce, but is a local business, like any manufacturing business, and therefore subject to local regulations and taxation. Even though movement of the minerals to other States may be an important next step after mining, the severance tax is at the point of severance before the minerals enter interstate commerce.

Courts have made a distinction in the case of "gas gathering" taxes where the taxable incident is the taking of gas directly from independent producers within a State for the sole purpose of immediately transporting it to another State. In this case the courts have said that the gas is already in interstate commerce at the point of taxation and, therefore, taxes do place a burden on interstate commerce exceeding the power of a State and consequently are invalid.

The courts have held generally that a severance tax based either on quantity or value is not arbitrary nor unreasonably discriminatory and does not violate the due process or equal protection clauses of the Constitution, and, further, that a severance tax in addition to a property tax does not constitute double taxation. The 14th amendment of the Constitution apparently does not require uniformity in taxation nor does it forbid double taxation.

The collection of a severance tax on royalties received by a landowner for production on his land does not impair the validity of a contract, according to the courts, even where the lease provides for delivery of a portion of the mineral to the landowner "free of charge."

Severance taxes based on quantity or a percentage of value produced, imposing different rates on different kinds of ore, and exempting certain classes of taxpayers, have been held not to violate the uniformity and equality of taxation requirements of most State constitutions also.

Although past court decisions would seem to indicate that there are no insurmountable legal problems to severance taxes so long as the individual legislation is carefully worded, observing all the legal rules and forms, the imposition of any new tax is open to challenge. A number of electric utility companies are currently considering a court test of the State of Montana coal severance tax on the grounds that the rate levied violates the interstate commerce clause of the U.S. Constitution.

EVALUATION OF THE SEVERANCE TAX AND ITS IMPACTS

It is not possible to evaluate the impact of the severance tax in specific terms because each case differs, depending upon all of the circumstances surrounding a specific application of the tax, the characteristics and features of the particular severance tax imposed, and the nature and conditions of the particular firms or industries affected. Some of the factors that determine impacts, however, can be listed and some of the more generally expected results of the severance tax noted.

A tax on minerals can bring about changes in a number of areas. An evaluation of impacts should consider each of these. The four items listed below are representative of the broader economic and social areas in which a tax on minerals might be expected to bring about changes and some of the questions raised.

1. Supply of Particular Minerals.--What adjustments will individual mining firms and mining industries be likely to make (or be forced to accept) in response to a severance tax in terms of level of production, prices, profits, expansion or contraction of operations, time preference in production, exploration and development of resources, competitiveness of individual firms and industries, location of industry, or other changed conditions of supply?

2. Demand for Specific Minerals.--Will adjustments made by mining firms change the level or nature of demand for particular minerals? Will they encourage substitution of different materials and changes in use of the minerals taxed?

3. Conservation.--What effects will the tax have on conservation of the minerals taxed, the balance between minerals left for future consumption and those developed for immediate use, the efficiency and completeness with which known mineral reserves are mined and the inducement to explore for new mineral deposits?

4. Social Implications.--How much redistribution of income will take place, and what will be the effects? What are the effects of different spending patterns that result from the State government spending revenues received from the tax rather than the taxed mining firms retaining and spending the same amount? What reallocation of resources between industries results from a change in prices and profits in the mineral industry? What are the effects of the broader distribution of benefits resulting from revenues going to a State under a severance tax rather than to a local government under a property tax on a mining property? How much price inflation will result

from the tax and what will its economic effect be? What changes in equity and efficiency of the tax system result from a severance tax rather than another type of tax?

More specific circumstances that must be considered for each tax application and the questions these raise include:

1. Structure of the Firm and Industry Upon Which the Tax is Levied.--Is the firm operating under conditions of competition, oligopoly, monopoly, or something in between? Does product differentiation exist, or is the product of all firms in the industry identical? What pricing policies prevail in the industry, that is, do firms attempt to maximize profit and are they in an optimum economic position prior to imposition of the tax. What are the shortrun and longrun cost conditions for firms in the industry?

2. Nature of Demand for the Mineral Taxed.--Is the mineral a small or large part of the total cost of the final product? Is demand for the mineral a direct or a derived demand (as in the case of an alloying metal in steel); does demand tend to be price elastic or price inelastic?

3. Nature of the Particular Severance Tax Imposed.--Is the tax a general tax on all minerals or on specific minerals only? Is it collected on a unit or value basis, gross receipts or proceeds, or net income on proceeds? What is the rate? How important is the tax in relation to other costs of production of the firm?

4. General Economic Conditions, Governmental Regulations, Changing Patterns of Consumer Tastes, and Technology of Mining, Metallurgy, etc.--The impact of a severance tax on a mining company, like any other tax, depends upon the extent to which that firm can pass on, or shift, the burden, or incidence, of that tax forward to the consumers of the mineral produced, or backward to its employees, suppliers, landowners, etc. Who, ultimately, must pay the tax? The factors enumerated above as determining the effects of a severance tax are the same factors that affect a firm's ability to shift the tax to some other group.

Expanding on the last of these four factors first, tax shifting takes place through changes in prices. If a mining firm is able to increase the price of the mineral it sells by the amount of the tax, the tax can be shifted forward to the consumer. If the firm is able to reduce wages paid to employees, royalties paid to landowners, or prices paid to equipment suppliers, then the tax can be shifted backward to those groups. The usual response is some combination of shifting the tax forward or backward, and the firm upon which the tax is imposed having to bear a part of the burden itself, depending upon the cost conditions and type of market under which the firm operates and the strength of the incentive the firm has for trying to get out from under the burden of the tax. The potential success with which a firm can do this can be analyzed by traditional economic price theory and partial equilibrium analysis. The processes through which firms adjust to the imposition of an additional cost in the form of a tax is complex and imprecise. Consequently, the following is a generalized outline of the responses that might be expected

from firms in different situations and with different types of severance taxes, and perhaps should be regarded as no more than marketplace tendencies or strategies.

A mining firm operating in market conditions of pure competition (a large number of sellers marketing an identical product) has no control over price and cannot immediately shift a severance tax forward by raising its price. A firm selling its product under a fixed-price contract without an escalation clause is in a similar short-term position. The tax is an addition to marginal and average cost at every level of output. Because marginal and average revenue or price remain the same, the firm will adjust to the higher cost imposed by an output, gross value, or income based severance tax by reducing output, labor force, and other factors of production.

The unit profit at the existing rate of recovery will be reduced by the tax. To return to the pretax rate of profit and to maintain the same discounted rate of future profit flow that it had before the tax, the firm will decrease its rate of recovery. The net effect of all firms making a similar adjustment would be a reduction in the mineral supplied, an increase in its market price, and a reduction in demand for the factors of production and a decrease in their price. The tax thus would be shifted partially forward and partially backward while some portion of the burden would remain with the mining firms.

In the longer run, less efficient firms would leave the industry because their new average cost would exceed selling price, further reducing supply and bringing about an increase in selling price. Equilibrium would be reestablished when average cost, including the tax, equals the new selling price for firms remaining in the industry. The effect on the level of recovery would be to make ore that was just marginally profitable to mine unprofitable. Thus, the level of recovery would decline.

Although pure competition is generally held to be uncommon, bituminous coal producers are among the mining firms that may operate quite closely to these conditions. Other mineral producers that compete in world markets that are controlled by world prices face much the same conditions. Firms producing such minerals are price takers having little or no ability to affect the world price. Their response to an increase in taxes would be very similar to that expected under pure competition with limited ability to shift the burden of the tax forward.

Mining firms operating in market conditions other than pure competition, such as monopolistic competition (many firms selling a differentiated product), oligopoly (a small number of firms), and monopoly (just one firm), face more inelastic demand curves and have more control over price. Reactions to imposition of a tax in these conditions will vary. Because the tax is an increase in average and marginal costs, the general response will still be a restriction in output. In the case of the oligopolist, an individual firm's response will depend upon what it expects its competitors to do and the interfirm strategies that prevail. A firm's response is indeterminant. It is possible that the increase in price will be no greater under conditions of monopoly

than under pure competition; it is more likely that the monopolist has a larger element of profit and can absorb some portion of the tax as a decrease in profit. Pure monopoly is probably rare in the mineral extraction industry.

The nature of the tax affects the success with which a firm can shift the burden of the tax to some other group. In general, a severance tax based on output, gross value, or income can be shifted to other groups in varying degrees through raising the price of the mineral and reducing both the rate (slowing production) and the level (raising the cutoff grade) of recovery of the mineral.

A severance tax imposed on net profits would have a somewhat different impact. In mining, there is often an element of abnormal profit, or economic rent, due to mineral scarcity, site superiority, or managerial superiority. Many economists believe that this surplus can be taxed by any amount short of confiscation without discouraging production. If a net profits tax is truly on an abnormal profit, its effects will be neutral, that is, it will not cause any adjustments in the rate and level of recovery. Opportunity and incentive for tax shifting would be limited. It could, however, become a cost and non-neutral if it did not allow for a normal return on equity and payment for risk. Marginal firms would not be affected because only profitable firms are taxed. Exploration and development are not taxed as they are, in effect, under a gross value, output, or income based tax.

A progressive tax based on net profits may cause adjustments in a firm's equilibrium rate and level of recovery that a proportional net profits tax would not because higher rates of profit could result in less total after-tax profit. The tendency would be to decrease the rate of recovery while increasing the level of recovery. The burden of a tax based on net profits tends to remain with the mining firm.

The relative magnitude of the severance tax rate in comparison with other mining costs, of course, will influence a mining firm's response to it. Normally, such a tax is one of the smaller costs facing the mining firm, whereas labor, equipment, plant, grade quality, and depth of the ore are much more important elements. In addition to being just one item in an array of costs, the severance tax is usually only one of several taxes mining firms must bear. The interaction of rate and base determines the effective burden on a mining firm. Rates can be misleading unless considered in the context of the whole tax structure. Exemptions (such as a minimum level of production), credits (as for property tax paid), and exclusions (such as firms under a given size) alter the actual tax paid.

Another factor listed as determining the economic effect of a tax, or a mining firm's ability to shift the burden of the tax, is the nature of demand for the mineral produced. A tax resulting in an increase in price of the mineral taxed has the effect of reducing the purchaser's income. The expected response is for the purchaser to reduce the quantity purchased or demand for the mineral taxed. Actual response, however, depends on the particular structure of demand for that mineral. If it is a small part of the total cost of the final product, demand for it is likely to be price inelastic. That is,

because it is such a small part of final cost, its price could change considerably without affecting total costs significantly. If demand for the mineral is a derived demand, that is, desired only because it is part of or use related to another product for which a demand exists, changes in price of the mineral as a result of increased taxation will not affect the level of demand. An example of both of these is molybdenum, which is used as an alloying material in steel. The demand for molybdenum in this case is derived from the demand for steel, and molybdenum is a relatively small element in steel, hence, changes in the price of molybdenum have little effect on either the cost or demand for steel and a tax on it could be shifted forward. However, if the price increase were great enough, the possibility of substitution could arise.

There is a question as to whether imposition of a severance tax affects competition between mining firms in different areas significantly enough to affect expansion and growth of mining in one State relative to other States. First, it is difficult for a mining firm to migrate from one State to another with mineral deposits occurring as they do. Second, as just noted, severance taxes are generally such a small part of overall cost that they are not likely to be an overriding factor in a mining firm's decisionmaking. Moreover, the tax situation is never certain. The favorable tax climate of one State relative to another could change as rapidly as the political and economic circumstances in those States. Generally speaking, it is unlikely that a reasonably based severance tax would have an adverse effect on mining expansion. If the severance tax is based on net income or value, it is only the current profitable extraction of ore that is taxed. If a mining operation cannot bear all the costs involved in bringing forth its product, including taxes, it is a submarginal operation and it is probably a mistake to continue to invest resources in continuing it.

The selectivity of a severance tax also will influence its final incidence. A tax imposed on only one of two competing mineral products will be more difficult to shift forward to the consumer than would be a general severance tax on all mineral products.

What are the implications of a severance tax for conservation of minerals? Conservation is not merely hoarding a mineral by reducing its rate of recovery but expanding the ultimate amount of the mineral produced from a deposit by lowering the cutoff grade and increasing the rate of discovery as well. A severance tax has mixed results on conservation. A severance tax based on output, gross value, or income represents an addition to production costs. As such, it will slow down the rate of recovery as explained above. Shifting production of a mineral to the future is one aspect of conservation. On the other hand, an increase in cost means raising the cutoff grade of ore that can be profitably produced, and a severance tax based on output, gross value, or income thus would prevent the economic extraction of low-grade, low-quality ore that might be produced in its absence. From this aspect then, a severance tax works against conservation. By raising the grade of workable ore, a severance tax reduces the size of targets for exploration, reducing future recovery of the mineral as well.

Finally, what are the social impacts of a severance tax? As a State rather than a local tax, a severance tax likely would permit a broader distribution of benefits. Just how revenue from severance taxes is spent varies from State to State. If the tax is in lieu of a property tax, a distribution back to the local government is necessary.

A severance tax rates fairly high in terms of equity and efficiency. It is easy to administer and does not entail high assessment or collection costs. Because payment is required only when production occurs, it has a good relationship to ability to pay. Differing ore values, however, prevent this from being a precise relationship. This feature of a severance tax may work a hardship on local governments faced with providing services to employees of a mine in the development stage not yet producing a taxable product.

THE SEVERANCE TAX IN PRACTICE

Since the first severance tax on minerals was adopted in 1846 by Michigan and its use broadened among States in the 1920's and 1930's, the number of States utilizing the severance tax on minerals has remained at about 25 to 30 during the past two decades. At the beginning of 1978, 29 States had severance taxes on minerals. Only 27 of these actually collected revenues under their severance taxes in fiscal year 1977.

Figure 1 is a map showing States that have severance taxes and, the major mineral commodity groups on which severance taxes are levied. States in the Northeastern part of the Nation as a group do not use the severance tax, and except for Virginia, West Virginia, and Pennsylvania, they are not large mineral producing States. Iowa, Missouri, and Illinois in the Midwest, and Oregon and Washington in the Northwest, do not have severance taxes. In the Southwest and mountain area only Arizona, an important mineral producer, does not have a severance tax. However, this is largely a matter of semantics as pointed out elsewhere since Arizona does have an occupational gross income tax of 2.5 percent on extractive industries that is similar to a severance tax.

Data in the following tables indicate the scope and coverage of severance taxes among both States and mineral commodities, as well as the significance of severance taxes in each State's total revenues and in value of mineral production. Care should be taken to not imply more from the relationships indicated than the data actually show.

Severance taxes do not represent the total tax on minerals States that levy severance taxes may also levy other mineral taxes. States that do not have a severance tax may levy some other type of taxation. The data are based on taxes classified as severance taxes and this can be more a matter of semantics than economic effect. The following tables and figures show the trend of States that levy severance taxes on minerals.

Table 1 indicates that of the 29 States with mineral severance taxes, 27 apply the tax to oil production (of 31 States that produce petroleum), 26 to gas production (of 31 States that produce gas), 16 to metals (of 29 States that produce metals), 14 to nonmetals (all 50 States produce nonmetals),

Figure 1

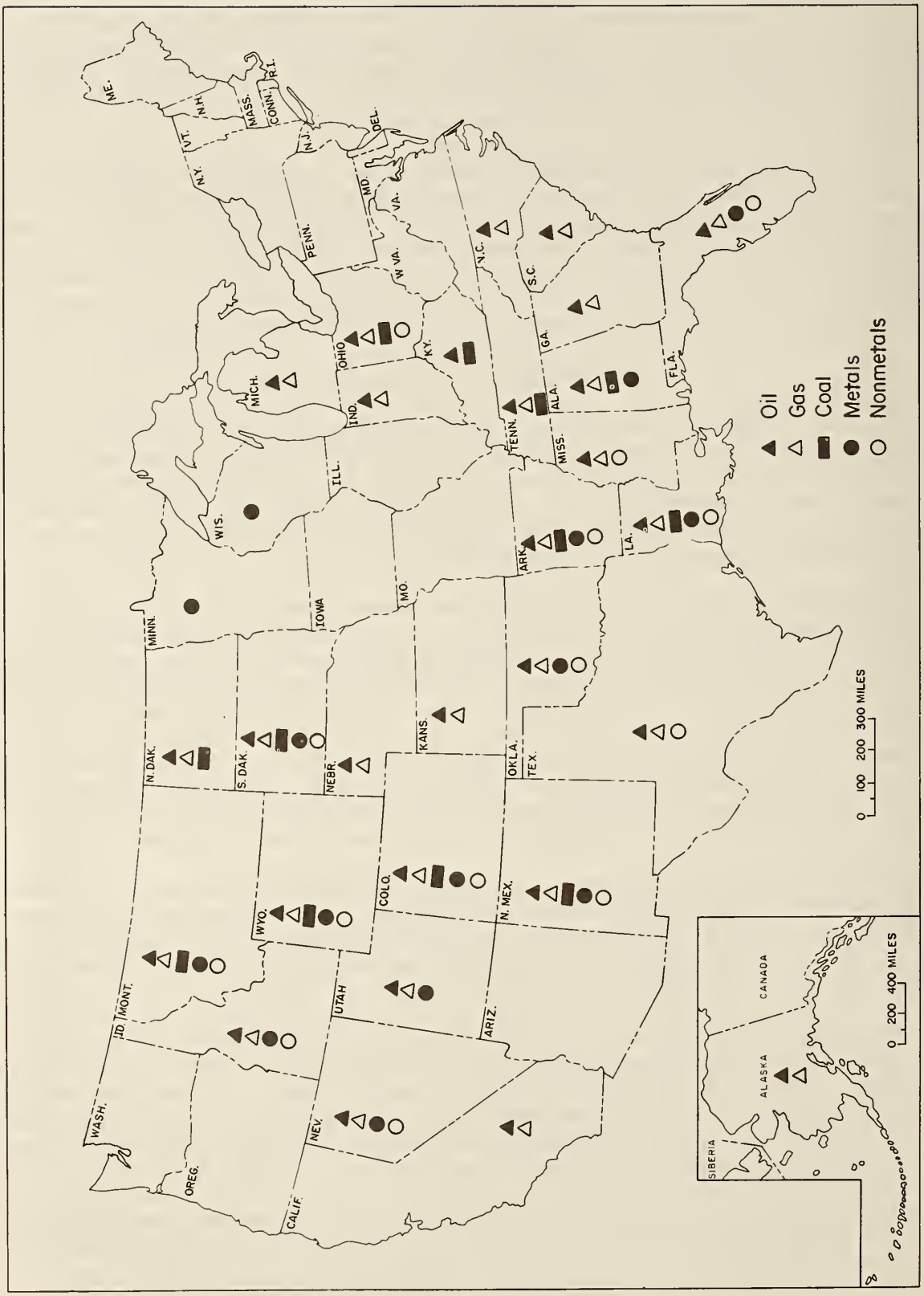

FIGURE 1. - Map of States with severance tax, by major commodity groupings.

and 11 to coal (of 26 States that produce coal). Taxation of oil and gas production is the major use of the severance tax. Eight States apply their severance tax only to oil and production. Of these, Georgia and North Carolina had no oil or gas production in 1977, and California levied the tax only for the purpose of paying the administration costs of its conservation program. Minnesota and Wisconsin have severance taxes on specified metals only, whereas 10 States have broadly based severance taxes on all minerals. Other States, although not having a severance tax that covers all mineral resources, in effect do tax all minerals actually produced in the State through severance taxes on those specific minerals.

TABLE 1. - State severance taxes on minerals, March 1978

State	Oil	Gas	Coal	Metals	Nonmetals	State	Oil	Gas	Coal	Metals	Nonmetals
Alabama.....	x	x	x	x	x	Nevada.....	x[1]	x[1]		x	x
Alaska.....	x	x				New Hampshire					
Arizona.....						New Jersey...					
Arkansas.....	x	x	x	x	x	New Mexico...	x	x	x	x	x
California...	x[1]	x[1]				New York.....					
Colorado.....	x	x	x	x	x	North					
Connecticut..						Carolina....	x[1]	x[1]			
Delaware.....						North Dakota.	x	x	x		
Florida.....	x	x		x	x	Ohio.....	x	x	x		x
Georgia.....	x	x				Oklahoma.....	x	x		x	x
Hawaii.....						Oregon.....					
Idaho.....	x	x		x	x	Pennsylvania.					
Illinois.....						Rhode Island.					
Indiana.....	x	x				South					
Iowa.....						Carolina....					
Kansas.....	x	x				South Dakota.	x	x	x	x	x
Kentucky.....	x			x		Tennessee....	x	x	x		
Louisiana....	x	x	x	x	x	Texas.....	x	x			x
Maine.....						Utah.....	x	x		x	
Maryland.....						Vermont.....					
Massachusetts						Virginia.....					
Michigan.....	x	x				Washington...					
Minnesota....				x		West Virginia					
Mississippi..	x	x			x	Wisconsin....				x	
Missouri.....						Wyoming.....	x	x	x	x	x
Montana.....	x	x	x	x	x	Total.....	27	26	11	16	14
Nebraska.....	x	x									

[1] Conservation purposes only.

Source: Commerce Clearing House, Inc. State Tax Guide: All States, New York, Chicago, and Washington, 1967 (with updated supplements to March 1978).

More than $2 billion in severance taxes collected in fiscal year 1977 (tables 2-3). This was about 2 percent of all State tax collections that year, or about 4 percent of the tax collections in those States with severance taxes. Although the evidence is not consistent, the importance of severance tax collections in total State tax collections appears to be increasing, at least over the past 7 years. Mineral severance taxes accounted for about 1.4 percent of total State tax collections in 1970, 1.7 percent in 1974, and 2.1 percent in 1977. Total State tax receipts increased about 111 percent between 1970 and 1977. Severance tax collections increased by about 216 percent during that period, or nearly twice as much. This differential rate of increase was somewhat wider in the last several years of the period than for the total period, suggesting an accelerating differential for severance tax collections. These figures are not adjusted for inflation, nor do they separate out the variety of causes that could account for these increases in severance tax collections. Increases may result from an increase in quantity of minerals produced, an increase in tax rates, extended coverage of the tax, additional States adopting the severance tax, a change in reporting classifications or more complete reporting of production, or more complete collections. The comparisons of severance tax collections with value of minerals produced (table 7) give additional analysis of comparative tax levels and burdens.

TABLE 2. - State severance tax collections, 1977

State	Total State tax revenues, thousands	Mineral severance tax revenues, thousands	Severance tax percent of total tax revenues	State percentage of all U.S. severance tax revenues	Severance tax location quotient[1]
Alabama	$1,403,674	$12,201	0.87	0.58	0.41
Alaska	773,787	23,705	3.06	1.12	1.46
Arizona	1,160,068	(2)	(2)	(2)	(2)
Arkansas	802,913	9,248	1.15	.44	.55
California	12,589,124	1,530	.01	.07	.01
Colorado	1,077,285	2,320	.22	.11	.10
Connecticut	1,457,139	(2)	(2)	(2)	(2)
Delaware	390,882	(2)	(2)	(2)	(2)
Florida	3,274,802	47,076	1.44	2.22	.69
Georgia	1,906,506	(3)	(3)	(3)	(3)
Hawaii	685,703	(2)	(2)	(2)	(2)
Idaho	367,823	203	.06	.01	.03
Illinois	5,319,547	(2)	(2)	(2)	(2)
Indiana	2,162,899	580	.03	.03	.01
Iowa	1,292,507	(2)	(2)	(2)	(2)
Kansas	969,005	816	.08	.04	.04
Kentucky	1,560,385	113,005	7.24	5.33	3.45
Louisiana	1,714,616	492,037	28.70	23.21	13.67
Maine	468,462	(2)	(2)	(2)	(2)
Maryland	2,127,712	(2)	(2)	(2)	(2)
Massachusetts	2,934,261	(2)	(2)	(2)	(2)
Michigan	4,790,719	9,459	.20	.45	.09
Minnesota	2,485,565	59,718	2.40	2.82	1.14
Mississippi	969,251	23,417	2.42	1.10	1.15
Missouri	1,598,094	(2)	(2)	(2)	(2)
Montana	312,399	43,543	13.94	2.05	6.64
Nebraska	610,235	1,131	.19	.05	.09
Nevada	329,069	105	.03	.00	.02
New Hampshire	200,231	(2)	(2)	(2)	(2)
New Jersey	3,103,725	(2)	(2)	(2)	(2)
New Mexico	597,604	102,783	17.20	4.85	8.20
New York	10,743,249	(2)	(2)	(2)	(2)
North Carolina	2,384,780	(3)	(3)	(3)	(3)
North Dakota	296,330	15,418	5.20	.73	2.48
Ohio	3,570,771	3,918	.11	.18	.05
Oklahoma	1,139,000	191,351	16.80	9.03	8.01
Oregon	973,145	(2)	(2)	(2)	(2)
Pennsylvania	5,590,840	(2)	(2)	(2)	(2)
Rhode Island	438,841	(2)	(2)	(2)	(2)
South Carolina	1,187,589	(2)	(2)	(2)	(2)
South Dakota	200,115	536	.27	.03	.13
Tennessee	1,529,531	2,052	.13	.10	.06
Texas	4,748,947	907,281	19.10	42.80	9.10
Utah	531,276	8,931	1.68	.42	.80
Vermont	229,803	(2)	(2)	(2)	(2)
Virginia	2,054,831	(2)	(2)	(2)	(2)
Washington	2,100,035	(2)	(2)	(2)	(2)
West Virginia	904,400	(2)	(2)	(2)	(2)
Wisconsin	2,733,294	698	.03	.03	.01
Wyoming	233,336	46,969	20.13	2.22	9.59
Total all 50 States	101,026,105	2,120,031	2.10	100.00	1.00
Total States with severance tax	51,773,755	2,120,031	4.09		

[1] A means of indicating relative importance; 1.00 means same relative importance as in the Nation as a whole; 2.00 would mean twice as important; 0.50 would mean half as important.

[2] No severance tax.

[3] No severance tax collections reported in 1977.

Source: U.S. Bureau of the Census. State Tax Collections in 1977. Series GF-77, No. 1, U.S. Government Printing Office, Washington, D.C.

TABLE 3. - State severance tax collections by commodity groupings, 1977

State	Severance tax, thousands				Percent of total		
	Total	Oil and gas	Coal	Metals and nonmetals	Oil and gas	Coal	Metals and nonmetals
Alabama	$12,201	$11,529	$672		94	6	0
Alaska	23,705	23,705			100	0	0
Arkansas	9,248	8,124	10	$1,114	88	(1)	12
California	1,530	1,530			100	0	0
Colorado	2,320	2,244	76		97	3	0
Florida	47,076	26,439		20,637	56	0	44
Georgia	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Idaho	203			203	0	0	100
Indiana	580	580			100	0	0
Kansas	816	816			100	0	0
Kentucky	113,005	408	112,597		(1)	100	0
Louisiana	492,037	485,339		6,698	99	0	1
Michigan	9,459	9,459			100	0	0
Minnesota	59,718			59,718	0	0	100
Mississippi	23,417	23,417			100	0	0
Montana	43,543	6,884	34,470	2,189	16	79	5
Nebraska	1,131	1,131			100	0	0
Nevada	105			105	0	0	100
New Mexico	102,783	100,418	499	1,866	98	(1)	2
North Carolina	(2)	(2)	(2)	(2)q	(2)	(2)	(2)
North Dakota	15,418	9,288	6,130		60	40	0
Ohio	3,918	1,146	1,531	1,241	29	39	32
Oklahoma	191,351	191,351			100	0	0
South Dakota	536	58		478	11	0	89
Tennessee	2,052		2,052		0	100	0
Texas	907,281	902,801		4,480	99	0	1
Utah	8,931	6,441		2,490	72	0	28
Wisconsin	698			698	0	0	100
Wyoming	46,969	39,074	5,087	2,809	83	11	6
Total	2,120,031	1,852,182	163,124	104,726	87	8	5

[1] Less than 1 percent.
[2] No severance tax collections in 1977.

Source: U.S. Bureau of the Census. State Tax Collections in 1977, Bureau of the Census unpublished data, various State Revenue departments. Figures for the States of Arkansas, New Mexico, and Wyoming are estimates based on State data that did not coincide with Bureau of the Census data.

In terms of value, severance tax collections are highly concentrated in just a few States (table 2). Texas collected the largest amount of severance taxes, $907 million in 1977, which was 43 percent of all severance taxes collected in the United States. Louisiana was second in importance, collecting $492 million in severance taxes in 1977, about 23 percent of all severance taxes. Thus, two States account for 66 percent of all severance taxes collected in the Nation. By comparison, the largest two States in terms of total tax collections, California and New York, together accounted for just 23 percent of total State tax collections. Other States with large severance tax revenues included Oklahoma with $191 million, 9.0 percent of total U.S. severance taxes; Kentucky, $113 million, 5.3 percent; and New Mexico, $102 million, 4.8 percent. States in the intermediate range of importance in amount of severance taxes collected include Minnesota with $60 million, 2.8 percent of total severance tax collections; Florida, $47 million, 2.2 percent; Wyoming, $47 million, 2.2 percent; and Montana, $44 million, 2.0 percent. These figures should not be misinterpreted to imply that the States with the largest total collections from the severance tax are necessarily those States which impose the highest rates. They are more frequently States with the larger amount of mineral production. Comparisons must be made between the tax rates, bases, and exemptions of tables 10-14, the collection data of table 2, and the mineral production data of table 4 for a more accurate picture of individual State application of the severance tax.

In terms of the importance of severance tax revenues to total tax revenues within individual States, the rankings of States are different. Severance taxes were most significant in Louisiana, where they were 29 percent of all taxes collected in the State in 1977. In Wyoming severance taxes provided 20 percent of all State tax revenues, 19 percent in Texas, 17 percent in New Mexico and Oklahoma, 14 percent in Montana, 7 percent in Kentucky, 5 percent in North Dakota, and 3 percent in Alaska. Severance taxes accounted for about 2.5 percent of all tax revenues in Minnesota and Mississippi. In only three other States, Arkansas, Florida, and Utah, did the severance tax account for as much as 1 percent of total State tax collections. Thus, severance taxes provided 10 percent or more of total State tax revenue in just five States whereas it provided between 1 and 7 percent in eight other States. Total size of State revenues is as important in establishing these percentages as is the amount of severance tax collected.

When severance tax collections are divided into major commodity groupings of oil and gas, coal, metals, and nonmetals (table 3), the most striking feature is, again, the high concentration of severance tax receipts derived from the production of oil and gas. Severance taxes on oil and gas provide 87 percent of all severance tax collections, coal production provides 8 percent, and production of metals and nonmetals another 5 percent. Fifteen of the 27 States having revenues from severance taxes in 1977 received 80 to 100 percent of that revenue from the tax on oil and gas production (100 percent for eight States). Coal provided one-third or more of severance tax receipts for five States (100 percent for two). Eight of the 27 States with severance tax revenues saw metallic and nonmetallic mineral production as the source for 27 percent or more of that revenue (four received 100 percent from these sources).

TABLE 4. - Value of mineral production, 1977[1]

State	States with severance tax		State	States without severance tax	
	Value of mineral product, millions	State mineral production as a percentage of total U.S. mineral production		Value of mineral product, millions	State mineral production as a percentage of total U.S. mineral production
Alabama	$1,287	1.67	Arizona	$1,581	2.05
Alaska	1,303	1.69	Connecticut	34	.04
Arkansas	568	.74	Delaware	2	.00
California	4,055	5.26	Hawaii	44	.06
Colorado	1,344	1.74	Illinois	1,746	2.27
Florida	1,605	2.08	Iowa	231	.30
Georgia	471	.61	Maine	42	.06
Idaho	218	.28	Maryland	196	.25
Indiana	617	.80	Massachusetts	74	.10
Kansas	1,342	1.74	Missouri	886	1.15
Kentucky	3,496	4.54	New Hampshire	18	.02
Louisiana	10,472	13.59	New Jersey	127	.17
Michigan	1,511	1.96	New York	439	.57
Minnesota	874	1.13	Oregon	117	.15
Mississippi	499	.65	Pennsylvania	3,199	4.15
Montana	686	.89	Rhode Island	6	.01
Nebraska	125	.16	South Carolina	147	.19
Nevada	251	.33	Vermont	38	.05
New Mexico	2,906	3.77	Virginia	1,128	1.46
North Carolina	218	.28	Washington	195	.25
North Dakota	277	.36	West Virginia	3,719	4.83
Ohio	1,494	1.94			
Oklahoma	3,501	4.54			
South Dakota	108	.14			
Tennessee	446	.58			
Texas	19,974	25.91			
Utah	1,141	1.48			
Wisconsin	141	.18			
Wyoming	2,181	2.83			
Total	63,111	81.87	Total	13,969	18.13

[1] Total value of U.S. mineral production in 1977, $77,080 million.

Source: U.S. Bureau of Mines. Mineral Industry Survey, Annual Preliminary, 1977 (all States).

Of the 16 States with severance tax revenues of $9 million or more in 1977, 10 received 80 percent or more from oil and gas production, 2 received 75 percent or more from coal production, and 2 received 40 percent or more from metallic and nonmetallic mineral production. Six of the 10 States receiving severance tax derived most of their revenue from oil and gas, 2 from coal, 1 from metal, and 1 about evenly divided between oil and gas and nonmetals.

States with severance taxes produced 82 percent of the Nation's minerals by value in 1977 (table 4). States without severance taxes produced 18 percent of the mineral value. It might be expected that there would be a close correlation between States with a significant mineral production and those which impose a special tax on this mineral production. This is generally the case, with some exceptions. Of the 20 States that produced 1 percent or more of the Nation's mineral value in 1977, or almost 90 percent of all minerals, 13 have severance taxes. The major exceptions are West Virginia, which produced 4.8 percent of the Nation's mineral value; Pennsylvania, 4.2 percent; Illinois, 2.3 percent; Arizona, 2 percent; and Virginia, 1.5 percent. It should be noted again that merely because these States do not have a tax on mineral production that is called a severance tax, does not mean minerals produced in those States are not as fully taxed as minerals produced in States with severance taxes. Arizona, for example, applies an occupation tax on gross proceeds or gross income from mining that is very similar to a severance tax, and West Virginia imposes a similar occupation or sales tax on gross proceeds or gross income from mining. Oil- and gas-producing States tend to lead in total value of mineral production, and coal-producing States follow in importance.

One choice States have in levying a mineral severance tax is the base to which it is applied. A mineral can be taxed on the basis of physical units produced, such as barrels or tons, or on the value of production. There appears to be a preference for using value as the base of severance taxes (table 5). In the application of severance taxes to oil and gas production, States use value as a base almost twice as frequently as they use a unit base. For metals and nonmetals, a per value base is three times more common than a per unit base. Seven States taxing coal with a severance tax, however, apply their tax on a per unit basis while only three utilize a per value base. Several States tax specific commodities on both a value and unit basis or on an either/or basis, whichever yields the greater revenue.

TABLE 5. - Basis of severance tax, unit or value, by State and major commodity

State	Oil	Gas	Coal	Metals	Nonmetals
Alabama	x	x	o	o	
Alaska	xo	xo			
Arkansas	xo	o	o	o	xo
California	o	o			
Colorado	x	x	o	xo	x
Florida	x	x		x	x
Georgia	o	o			
Idaho	o	o		x	x
Indiana	x	x			
Kansas	o	o			
Kentucky	x		x		
Louisiana	x	xo	o	o	o
Michigan	x	x			
Minnesota				xo	
Mississippi	xo	xo			x
Montana	x	x	xo	x	xo
Nebraska	x	x			
Nevada	o	o		x	x
New Mexico	xo	xo	xo	xo	x
North Carolina	o	o			
North Dakota	x	x	o		
Ohio	o	o	o		o
Oklahoma	x	xo		x	x
South Dakota	x	x	x	x	x
Tennessee	o	x	o		
Texas	xo	x			o
Utah	x	x		x	
Wisconsin				x	
Wyoming	x	x	x	x	x
Total x's	14	13	3	9	9
Total o's	8	8	7	3	3
Total xo's	5	5	2	3	2

Legend: x = value.
o = unit.
xo = both.

Source: Commerce Clearing House, Inc. State Tax Guide: All States, New York, Chicago, and Washington, 1967 (with updated supplements to March 1978).

A per value base has the advantage of yielding increased revenues as the price of the commodity taxed increases, whereas a per unit tax must be revised to yield more revenue, unless it is tied to a price index. A comparison of minerals taxed under a severance tax with the principal minerals produced in each State indicates that nonmetallics, particularly stone and sand and gravel production, are least likely to be taxed by a mineral severance tax (table 6), and that States in which sand and gravel and other nonmetallics are the principal minerals produced in terms of value are less likely to have a severance tax. Only one State (Illinois) in which petroleum is among the major minerals produced does not have a severance tax.

TABLE 6. - Principal mineral products of each State and minerals taxed by severence tax, 1977

State	Principal minerals in order of value	Minerals taxed under severance tax
Alabama.....	Coal, petroleum, cement, stone.....	Iron ore, petroleum, natural gas, coal.
Alaska.....	Petroleum, sand and gravel, natural gas, stone.	Petroleum and natural gas.
Arizona.....	Copper, molybdenum, sand and gravel, silver....	None.
Arkansas.....	Petroleum, bromine, stone, natural gas.....	All minerals.
California....	Petroleum, natural gas, cement, sand and gravel	Petroleum and natural gas.
Colorado.....	Petroleum, molybdenum, coal, sand and gravel...	Petroleum, natural gas, coal, molybdenum, oil shale, all metals.
Connecticut...	Stone, sand and gravel, feldspar, lime.....	None.
Delaware.....	Sand and gravel, magnesium compounds, clays....	Do.
Florida.....	Phosphate rock, petroleum, stone, cement.....	Petroleum, natural gas, phosphate rock, lime, stone, sand and gravel.
Georgia.....	Clays, stone, cement, sand and gravel.....	Petroleum and natural gas.
Hawaii.....	Stone, cement, sand and gravel, pumice.....	None.
Idaho.....	Silver, phosphate.rock, zinc, lead.....	Petroleum, natural gas, all ores.
Illinois.....	Coal, petroleum, stone, sand and gravel.....	None.
Indiana.....	Coal, cement, stone, petroleum, sand and gravel	Petroleum, natural gas, other hydrocarbons.
Iowa.....	Cement, stone, sand and gravel, gypsum.....	None.
Kansas.....	Petroleum, natural gas, natural gas liquids, cement.	Petroleum and natural gas.
Kentucky.....	Coal, stone, petroleum, natural gas.....	Petroleum and coal.
Louisiana.....	Petroleum, natural gas, natural gas liquids, salt.	All natural resources (petroleum, natural gas, butane, propane, stone, coal, sand and gravel, marble, ores, salt, sulfur).
Maine.....	Sand and gravel, cement, zinc, stone.....	None.
Maryland.....	Stone, cement, sand and gravel, coal.....	None; Allegany County--natural gas.
Massachusetts.	Stone, sand and gravel, lime, clays.....	None.
Michigan.....	Iron, cement, copper, sand and gravel.....	Petroleum and natural gas.
Minnesota.....	Iron, sand and gravel, stone, cement.....	Iron ores, other ores, taconite, semi-taconite, iron sulfide, copper-nickel.
Mississippi...	Petroleum, natural gas, sand and gravel, cement	Petroleum, natural gas, salt.
Missouri.....	Lead, cement, stone, iron.....	None.
Montana.....	Petroleum, copper, coal, silver.....	All minerals (coal, all metals, precious and semiprecious gems, petroleum, natural gas, micaceous minerals, cement, gypsum).

Nebraska.....	Petroleum, cement, sand and gravel, stone.....	Petroleum and natural gas.
Nevada.....	Copper, gold, sand and gravel, diatomite.....	All minerals, petroleum, natural gas.
New Hampshire.	Sand and gravel, stone clays, gem stones.....	None.
New Jersey....	Stone, sand and gravel, zinc, titanium concentrates.	Do.
New Mexico....	Petroleum, natural gas, copper, natural gas liquids, uranium.	All minerals (lead, silver, zinc, fluorspar, clay, sand and gravel, oil, gas), potash, molybdenum, uranium, copper, gold.
New York.....	Cement, stone, salt, zinc.....	None.
North Carolina	Stone, sand and gravel, cement, feldspar.....	Petroleum and natural gas.
North Dakota..	Petroleum, coal, sand and gravel, natural gas..	Petroleum, natural gas, coal.
Ohio.....	Coal, stone, cement, lime.....	Coal, salt, limestone, dolomite, sand and gravel, petroleum, natural gas.
Oklahoma.....	Petroleum, natural gas, natural gas liquids, stone.	Petroleum, natural gas, asphalt, lead, zinc, jack, silver, gold, uranium, copper.
Oregon.....	Sand and gravel, stone, cement, nickel.....	None.
Pennsylvania..	Coal, cement, stone, lime, natural gas.....	Do.
Rhode Island..	Sand and gravel, stone, gem stones.....	Do.
South Carolina	Cement, stone, clays, sand and gravel.....	Do.
South Dakota..	Gold, sand and gravel, cement, stone.....	All minerals.
Tennessee.....	Coal, stone, zinc, phosphorous.....	Petroleum, natural gas, coal.
Texas.....	Petroleum, natural gas, natural gas liquids, cement.	Petroleum, natural gas, sulfur, cement.
Utah.....	Copper, petroleum, coal, gold.....	All metals (gold, silver, copper, lead, iron, zinc, tungsten, uranium), petroleum, natural gas, other hydrocarbons.
Vermont.....	Stone, asbestos, sand and gravel, talc.....	None.
Virginia.....	Coal, stone, sand and gravel, cement.....	Do.
Washington....	Sand and gravel, cement, coal, stone.....	Do.
West Virginia.	Coal, natural gas, petroleum, stone.....	Do.
Wisconsin.....	Sand and gravel, stone, iron, cement, copper...	Copper.
Wyoming.....	Petroleum, coal, trona, natural gas, uranium...	Petroleum, natural gas, gold, silver, other precious metals, soda, saline, uranium, bentonite, coal, trona, oil shale, other fossil fuels, other valuable deposits.

Source: U.S. Bureau of Mines. Minerals Yearbook, 1973.
Commerce Clearing House, Inc. State Tax Guide: All States, New York, Chicago, and Washington, 1967 (with updated supplements to March 1978).

Data that would permit an analysis of the relative burden of severance tax on individual mining firms and subsequently its influence in their costs and decision-making process is very limited and generally unavailable. The comparisons of severance tax collections and the value of mineral production in each State (table 7) are an indication of the relative size of the tax and total revenues of mining firms from which some limited implications of burden can be drawn. The 1977 severance tax collection of $2.1 billion was about 3.4 percent of the $63 billion total value of mineral production in States that have the tax. Considerable differences exist between States. Severance tax collections were the largest share of the total value of mineral production in Minnesota, where the tax was 6.8 percent of total value of minerals produced. In Montana the ratio was 6.3 percent; North Dakota, 5.6 percent; Oklahoma, 5.5 percent; Louisiana, 4.7 percent; Mississippi, 4.7 percent; Texas, 4.5 percent; and New Mexico, 3.5 percent. At the other end of the scale, California's severance tax collections were only 0.04 percent of the value of mineral production, reflecting California's use of this tax for conservation purposes rather than for raising revenue. Nevada, Kansas, and Idaho also had very low ratios of 0.04, 0.06, and 0.09, respectively.

TABLE 7. - State severance taxes as a share of mineral production value, 1977

State	Value of mineral production, millions	Mineral severance tax, millions	Severance tax as percent of State's mineral production
Alabama	$1,287	$12.2	0.95
Alaska	1,303	23.7	1.82
Arkansas	568	9.2	1.62
California	4,055	1.5	.04
Colorado	1,344	2.3	.17
Florida	1,605	47.1	2.93
Georgia	471	(1)	.00
Idaho	218	.2	.09
Indiana	617	.6	.10
Kansas	1,342	.8	.06
Kentucky	3,496	113.0	3.23
Louisiana	10,472	492.1	4.70
Michigan	1,511	9.5	.63
Minnesota	874	59.7	6.83
Mississippi	499	23.4	4.69
Montana	686	43.5	6.34
Nebraska	125	1.1	.88
Nevada	251	.1	.04
New Mexico	2,906	102.8	3.54
North Carolina	218	(1)	.00
North Dakota	277	15.4	5.56
Ohio	1,494	3.9	.26
Oklahoma	3,501	191.4	5.47
South Dakota	108	.5	.46
Tennessee	446	2.1	.47
Texas	19,974	907.3	4.54
Utah	1,141	8.9	.78
Wisconsin	141	.7	.50
Wyoming	2,181	47.0	2.15
Total	63,111	2,120.0	3.36

[1] No severance tax collections in 1977.

Source: Tables 2, 4.

The data in table 7 leads one to seek a positive correlation between the size of mineral production in a State and the portion that is claimed by the State in severance taxation. All States with mineral production of more than $2 billion in 1977 did have a severance tax collection of more than 3 percent, except California and Wyoming, and Pennsylvania and West Virginia which have no severance tax. However, several small producing States also collected a relatively large amount of severance tax while some middle-size producers collected a relatively small amount. The evidence of this table does not seem to substantiate the hypothesis of a positive relationship between the size of mineral industry in a State and the proportion of its revenues appropriated as severance tax.

A relatively few States dominate mineral production in this country and there is an even greater degree of concentration in severance tax collections among a few States (table 8). Two-thirds of the Nation's minerals by value is produced in 8 States (all producers of fuels--oil, gas, or coal); 90 percent of its mineral value is by 20 States. The greater degree of concentration in severance tax collection is seen in the fact that two-thirds of total severance tax revenues in 1976 were collected by just two States (Texas and Louisiana, which were also the two largest mineral producers) and just seven States received 90 percent of all severance tax revenues.

TABLE 8. - Relative dominance of States in value of mineral production and severance tax collection, 20 major mineral producing States, 1977

State	Total value of State mineral production, millions	Percentage of U.S. mineral production	Cumulative percentage	Severance tax, millions	Percentage of total U.S. severance taxes
Texas.....	$19,974	25.9	25.9	$907	42.8
Louisiana.....	10,472	13.6	39.5	492	23.2
California.....	4,055	5.3	44.8	2	.1
West Virginia...	3,719	4.8	49.6	(1)	(1)
Oklahoma.....	3,501	4.5	54.1	191	9.0
Kentucky.....	3,496	4.5	58.6	113	5.3
Pennsylvania....	3,199	4.2	62.8	(1)	(1)
New Mexico.....	2,906	3.8	66.6	103	4.8
Wyoming.....	2,181	2.8	69.4	47	2.2
Illinois.....	1,746	2.3	71.7	(1)	(1)
Florida.....	1,605	2.1	73.8	47	2.2
Arizona.....	1,581	2.1	75.9	(1)	(1)
Michigan.....	1,511	2.0	77.9	9	.4
Ohio.....	1,494	1.9	79.8	4	.2
Colorado.....	1,344	1.7	81.5	2	.1
Kansas.....	1,342	1.7	83.2	1	.04
Alaska.....	1,303	1.7	84.9	24	1.1
Alabama.....	1,287	1.7	86.6	12	.6
Utah.....	1,141	1.5	88.1	9	.4
Virginia.....	1,128	1.5	89.6	(1)	(1)

[1] State does not have severance tax.

NOTE.--15 States with severance tax = 75 percent of U.S. mineral production.
5 States without severance tax = 15 percent of U.S. mineral production.

Source: Table 7.

The severance tax has had increasing importance in the tax revenues of those States that are the major recipients of revenues from this source (table 9). The contribution of severance tax revenues to total revenues rose from an estimated average of 2.7 percent in 1970, for all States having severance taxes, to about 4.1 percent in 1977. The median share of severance tax to total tax receipts for all severance tax States rose from about 0.2 to 1.2 percent, still not an impressive share of total tax receipts. If we arbitrarily assume that about 5 percent of the total is a significant contribution, however, the number of States in which severance taxes are significant rose from five in 1970 to eight in 1977. If 10 percent seems more significant, the number of States so classified increased from four in 1970 to six in 1977. For individual States, the change in importance of the severance tax is more dramatic. In 1970, 5 percent of Wyoming's total State tax collections came from the severance tax; in 1977, the severance tax share was 20 percent. In Montana, the severance tax share of total State tax collections increased from about 3.7 percent in 1970 to 13.9 percent in 1977. The increased productivity of severance taxes is the result not only of increased production of minerals, particularly coal in the case of Montana and Wyoming, but also an increase in per unit value of minerals taxed and an increase in the rates of severance taxes levied in a number of States; for example, Montana.

TABLE 9. - Changing share of severance taxes in total State tax collections--1970, 1975, 1977

1970		1975		1977	
State	Percent	State	Percent	State	Percent
Louisiana.....	29.3	Louisiana.....	35.6	Louisiana.....	28.7
Texas.....	14.2	Texas.....	18.3	Wyoming.....	20.1
New Mexico.....	13.3	Oklahoma.....	14.5	Texas.....	19.1
Oklahoma.....	10.1	New Mexico.....	13.4	New Mexico.....	17.2
Wyoming.....	5.0	Alaska.....	13.1	Oklahoma.....	16.8
Montana.....	3.7	Wyoming.....	11.8	Montana.....	13.9
North Dakota...	2.6	Kentucky.....	7.7	Kentucky.....	7.2
Minnesota.....	1.9	Montana.....	6.3	North Dakota...	5.2
Utah.....	1.7	North Dakota...	2.6	Alaska.....	3.1
Arkansas.....	1.0	Mississippi....	2.6	Minnesota.....	2.4
Nebraska.....	.3	Minnesota.....	1.8	Mississippi....	2.4
Colorado.....	.2	Utah.....	1.6	Utah.....	1.7
Alabama.....	.2	Florida.....	1.1	Florida.....	1.4
Idaho.....	.2	Arkansas.....	1.0	Arkansas.....	1.2
Kansas.....	.1	Alabama.....	.9	Alabama.....	.9
Average all States with severance tax.....	[e]2.7	Average all States with severance tax.....	4.1	Average all States with severance tax.....	4.1
Median all States with severance tax.....	.2	Median all States with severance tax.....	.9	Median all States with severance tax.....	1.2

[e] Estimate.

Source: U.S. Bureau of the Census. State Tax Collections in 1970, 1975, and 1977.

In tables 10 through 14, the severance tax laws of all 29 States that impose such a tax on minerals are divided into five tables that permit a comparison of the various features of each State's severance tax by major commodity groupings--oil, gas, coal, metals, and nonmetals. The difference in treatment among the individual States is apparent. Many States have a single tax and a single rate for each commodity taxed; others have several severance taxes that apply to a particular commodity. New Mexico, for example, has four taxes on oil and five on gas, and Minnesota has four on iron ores plus several additional taxes within these. The tax rate and base may be simple; for example, Tennessee's $0.20 per ton tax on coal, or it may be complex as in Montana's tax on coal, which varies according to the heating quality of the coal mined and whether it is mined by surface or underground methods with choice of a per ton or value basis, whichever yields the greater tax.

Severance taxes on oil are commonly between 2 and 5 percent of gross value, but range from 0.5 to 1 percent in Kentucky to 12.5 percent in Louisiana. Some are in lieu of all other State taxes; others are in addition to all other taxes. Some are to pay for specific purposes such as conservation; others are simply to raise revenue for the State. Comparison of rates is not very meaningful unless differences in base and exemption can be netted out to arrive at an effective rate per some common unit.

Oil and gas are generally lumped together in severance tax legislation and have a similarity in rates, bases, and other provisions. Only Kentucky taxes one (oil) and not the other.

Severance tax rates on coal range from $0.02 per ton in Arkansas, which is also in lieu of all other privilege or excise taxes, to $0.60 per ton of surface mined coal in Colorado; the rate also is tied to the wholesale price index to provide for a 1 percent change in the rate for every 3-point change.

TABLE 10. - Mineral severance taxes--rates, bases, other features--oil

State	Tax	Base	Rate	Other features
Alabama.....	Oil and gas conservation.....	Gross value.....	2 pct	
	Oil and gas production.....	.....do.....	4 pct	
Alaska.....	.....do.....	.....do.....	12.25 pct or	Multiplied by an economic limit factor (1 minus the ratio of the monthly production rate at the economic limit to the production during the month for which the tax is paid). Per barrel tax varies with API gravity. In lieu of all other State and municipal taxes except conservation and income taxes. Credit allowed against development costs, not to exceed 50 pct of gross production tax.
		Per barrel.....	$0.60 (for old crude)	
		.....do.....	$0.80 (other) (whichever is greater)	
	Regulation and conservation..	.....do.....	$0.00125	
Arkansas.....	Natural resources severance..	Market value.....	4 pct if 10 bbl/day less. 5 pct if more than 10 bbl/day.	Plus an additional $0.005 per barrel. No other privilege or excise tax on oil.
	Oil and gas conservation.....	Per barrel.....	$0.01	
California.....	Oil and gas production.....	.....do.....	$0.007	Rate determined annually by Department of Conservation, based upon conservation cost; 1977 rate, $0.007042. In addition to all other taxes.
Colorado.....	Severance.....	Gross income of--		Credit allowed for some ad valorem taxes. Wells producing less than 106 bbl/day exempted.
		Less than $25,000...	2 pct	
		$25,000-$100,000....	3 pct	
		$100,000-$300,000...	4 pct	
		Over $300,000.....	5 pct	
	Oil and gas conservation.....	Market value.....	0.06 pct	Not to exceed 0.1 pct. As of April 1, 1978, rate is $0.0006 per $1 market value.
Florida.....	Oil and gas production.....	Gross value.....	8 pct	Includes royalty interest.
Georgia.....	.....do.....	Per barrel.....	$0.005	
Idaho.....	.....do.....	.....do.....	$0.005	Rate set annually by Gas Conservation Commission, not to exceed $0.005 per barrel. United States, Idaho, and Indian interests exempted as is oil used in production.
Indiana.....	Petroleum production.....	Value.....	1 pct	In addition to all other taxes.
Kansas.....	Oil and gas production.....	Per barrel.....	$0.0035	Prevention of stream pollution, $0.001; conservation, $0.0025.
Kentucky.....	Oil production.....	Market value.....	0.5 pct	At point when first transported; counties may impose similar tax not to exceed 1 pct, and 61 counties do so.
Louisiana.....	Natural resources severance..	Value.....	12.5 pct	Value is the higher of gross receipts less transportation or posted field price at time and place of severance. Rate is reduced for low capacity wells. Distillate, condensate, etc., produced with oil taxed at same rate.
Michigan.....	Gas and oil severance.....	Gross market value..	3 pct	2 pct of gross cash market value plus a fee not to exceed 1 pct of value of oil produced the previous year.

Mississippi....	Oil and gas severance.....	Per barrel.....	$0.06 or	In lieu of all ad valorem taxes.
		Market value.....	6 pct (whichever is greater)	
		Per barrel.....	$0.006	Oil and Gas Board Maintenance Tax not to exceed 6 mills per barrel.
Montana.....	Oil or gas producers severance.	Gross value--		
		First $6,000.....	2.1 pct	
		Over $6,000.....	2.65 pct	
		Market value.....	0.2 pct	Conservation tax. Maximum rate is 0.2 pct of market value.
	Mineral mining.....	Gross value.....	0.5 pct	$25 plus 0.05 pct on gross value over $5,000.
Nebraska.....	Oil and gas severance.....	Value.....	2 pct	Oil used in production exempt.
	Oil and gas conservation.....	.....do.....	0.2 pct	Not to exceed 0.4 pct.
Nevada.....	.....do.....	Per barrel.....	$0.005	
New Mexico.....	Oil and gas severance.....	.....do.....	$0.45	Including liquid hydrocarbons removed from natural gas. On July 1, 1978, and each succeeding year, tax rate will be increased by a surtax based on the consumer price index.
	Oil and gas privilege.....	Value.....	2.55 pct	Royalties paid to the United States, State, and Indians, exempted as are transportation costs and products taxed under occupational gross income tax.
	Oil and gas conservation.....	.....do.....	0.19 pct	May be raised or lowered depending on amount in conservation fund.
	Oil and gas ad valorem production.	.....do.....	Rate certified to Oil and Gas Accounting Commission.	Local ad valorem rate is applied to assessed valuation less certain deductions. In lieu of all other ad valorem taxes except on equipment.
North Carolina.	Oil and gas conservation.....	Per barrel.....	$0.005	
North Dakota...	Oil and gas production.....	Gross value.....	5 pct	In lieu of State and local property taxes. Includes royalty interests.
Ohio.....	Resource severance.....	Per barrel.....	$0.03	
Oklahoma.....	Oil, gas, and mineral gross production.	Gross value.....	7.085 pct	Paid by purchasers at time of production or by producer if not sold at time of production. Adjustment for low-producing wells.
South Dakota...	Oil and gas severance.....	.....do.....	4.5 pct	In lieu of all other mineral taxes except sales, use, and property taxes. Federal, State, and local royalty interest exempted.
Tennessee.....	Oil production.....	Per 50-gal bbl.....	$0.05	Drilling fee $10 per 1,000 ft.
Texas.....	.....do.....	Market value.....	4.6 pct	Paid by first purchaser unless oil is unsold for 1 month, then by producer.
		Per barrel.....	$0.001875	Additional tax imposed.
Utah.....	Mining occupation.....	Gross value.....	2 pct	Annual exemption of $50,000 for each well.
	Oil and gas conservation.....	Market value.....	0.15 pct	Not to exceed 0.2 pct; United States, State, and Indian interests exempted.
Wyoming.....	Mining excise and severance..	Gross value--		In lieu of taxes on land.
		10 bbl/day or less..	2 pct	
		More than 10 bbl/day	4 pct	
	Oil and gas production.....	Gross value.....	0.03 pct	Rate set by Oil and Gas Conservation Commission, not to exceed 0.04 pct; United States, State, and Indian interests exempted.

TABLE 11. - Mineral severance taxes--rates, bases, other features--gas

State	Tax	Base	Rate	Other features
Alabama.....	Oil and gas conservation.....	Gross value.....	2 pct	
	Oil and gas production.....	.....do.....	4 pct	
Alaska.....	.....do.....	.....do.....	10 pct or	Multiplied by the economic limit factor (see table 10, Alaska). Credit allowed for development costs up to 50 pct of gross production tax.
		Per 1,000 cu ft.....	$0.064 (whichever is greater)	
Arkansas.....	Natural resources severance..	.....do.....	$0.003	No other privilege or excise tax on gas.
	Oil and gas conservation.....	.....do.....	$0.001	
California.....	Oil and gas production.....	Per 10,000 cu ft....	$0.007	Rate determined annually by Department of Conservation, based upon conservation cost; 1977 rate, $0.007042. In addition to all other taxes.
Colorado.....	Severance.....	Gross income of--		Credit allowed for some ad valorem taxes. This tax will be replaced by the Mineral Severance Tax, January 1, 1978, with same rates.
		Less than $25,000...	2 pct	
		$25,000-$100,000....	3 pct	
		$100,000-$300,000...	4 pct	
		Over $300,000.....	5 pct	
	Oil and gas conservation.....	Market value.....	0.06 pct	Not to exceed 0.1 pct.
Florida.....	Oil and gas production.....	Gross value.....	5 pct	Includes royalty interest.
Georgia.....	.....do.....	Per 1,000 cu ft.....	$0.0005	
Idaho.....	.....do.....	Per 50,000 cu ft....	$0.005	Rate set annually by Gas Conservation Commission, not to exceed $0.005 per 50,000 cu ft. United States, State, and Indian interests exempted as is gas used in production.
Indiana.....	Petroleum production.....	Value.....	1 pct	In addition to all other taxes. Gas used in production exempted.
Kansas.....	Oil and gas production.....	Per 1,000 cu ft.....	$0.00085	Prevention of stream pollution, $0.00005; conservation, $0.00008.
Louisiana.....	Natural resources severance..	Per 1,000 cu ft--		
		Wells of 15.025 lb/sq in.	$0.07	
		Wells of 50 lb/sq in	$0.03	
		Wells incapable of producing 250,000 cu ft/day.	$0.013	
		Gross value.....	12.5 pct	Distillate, condensate, etc., severed with gas.
		Per barrel.....	$0.10	Natural gasoline, casinghead gasoline, and other natural gas liquids, ethane, or methane recovered through processing gas after separation of oil, distillate, etc.
		.....do.....	$0.05	Butane and propane recovered through processing gas.
Maryland (Allegany County).	.....	Market value.....	7 pct	The State of Maryland does not impose a severance tax; Allegany County, Md., does.
Michigan.....	Gas and oil severance.....	Gross market value..	3 pct	The Gas and Oil Severance Tax is 2 pct, plus a fee not to exceed 1 pct of value of oil produced the previous year.

Mississippi....	Oil and gas severance.....	Value.....	6 pct or	Casinghead gas included. In lieu of all ad valorem taxes.
		Per 1,000 cu ft.....	$0.003 (whichever is greater)	
		.....do.....	$0.0004	Oil and Gas Board Maintenance not to exceed 0.0001 mill per 1,000 cu ft.
Montana.....	Oil or gas producers severance.	Gross value.....	2.65 pct	Limited exemption for deep wells drilled after specified date.
		Market value.....	0.2 pct	Conservation tax. Maximum rate is 0.2 pct of market value.
	Mineral mining.....	Gross value.....	0.5 pct	$25 plus 0.5 pct on gross value over $5,000.
Nebraska.....	Oil and gas severance.....	Value.....	2 pct	Gas used in production exempt.
	Oil and gas conservation.....	.....do.....	0.2 pct	Not to exceed 0.4 pct.
Nevada.....	.....do.....	Per 50,000 cu ft....	$0.005	
New Mexico.....	Oil and gas severance.....	Per 1,000 cu ft.....	$0.05	On July 1, 1978, and each succeeding year, a surtax based on the consumer price index will be added.
	Oil and gas privilege.....	Value.....	2.55 pct	Royalties paid to the United States, State, and Indian interests exempted as are transportation costs and products taxed under occupational gross income tax.
	Natural gas processors.....	.....do.....	0.45 pct	Includes hydrocarbons. Defines specific processors.
	Oil and gas conservation.....	.....do.....	0.19 pct	May be raised or lowered depending on amount in conservation fund.
	Oil and gas ad valorem production.	.....do.....	Rate certified to Oil and Gas Accounting Commission.	Local ad valorem rate is applied to assessed valuation less certain deductions. In lieu of all other ad valorem taxes on oil interests except equipment.
North Carolina.	Oil and gas conservation.....	Per 1,000 cu ft.....	0.0005	
North Dakota...	Oil and gas production.....	Gross value.....	5 pct	In lieu of State and local property taxes. Includes royalty interests.
Ohio.....	Resource severance.....	Per 1,000 cu ft.....	$0.01	
Oklahoma.....	Oil, gas, and mineral gross production.	Gross value.....	7.085 pct	Casinghead gas included. Adjustment for low-producing wells.
	Natural gas and casinghead gas conservation excise.	Per 1,000 cu ft.....	$0.07	7 pct of gross value of each 1,000 cu ft is deductible from tax. Tax rate not to exceed 0.333 of gross value of each 1,000 cu ft.
South Dakota...	Oil and gas severance.....	Gross value.....	4.5 pct	In lieu of all other mineral taxes except sales, use, and property taxes.
Tennessee.....	Oil production.....	Sales price.....	5 pct	Gas used in production exempted. Drilling fee $10 per 1,000 cu ft.
Texas.....	Natural gas production.....	Market value.....	7.5 pct	
Utah.....	Mining occupation.....	Gross value.....	2 pct	Annual exemption of $50,000 in gross value for each well.
	Oil and gas conservation.....	Market value.....	0.15 pct	Not to exceed 0.2 pct. United States, State, and Indian interests exempted.
Wyoming.....	Mining excise and severance..	Gross value.....	4 pct	In lieu of tax on land.
	Oil and gas production.....	.....do.....	0.03 pct	Not to exceed 0.04 pct. United States, State, and Indian interests exempted.

TABLE 12. - Mineral severance taxes--rates, bases, other features--coal

State	Tax	Base	Rate	Other features
Alabama.....	Coal and severance.....	Per ton.....	$0.135	
	Coal and lignite severance...	.....do.....	$0.20	In addition to Coal Severance Tax and $0.50 per ton Coal Severance Tax levied in De Kalb County.
Arkansas.....	Natural resources severance..	.....do.....	$0.02	Coal and lignite. In lieu of all other privilege or excise taxes.
Colorado.....	Severance.....	Per ton (surface).....	$0.60	Rate changes 1 pct for every 3-point change in the wholesale price index; 8,000 tons per quarter exempted; 50 pct credit for lignitic coal and for coal produced underground.
		Per ton (underground)..	$0.30	
	Mine license.....	Per mine--		Fee charged each mine, varies by level of production.
		500 tons or less.....	$10	
		500-1,000 tons.....	$25	
		More than 1,000 tons...	$50	
Kentucky.....	Coal severance.....	Gross value.....	4.5 pct	Minimum tax $0.50 per ton.
Louisiana.....	Natural resources severance..	Per ton.....	$0.10	
Montana.....	Coal severance.....	Per ton or value (whichever is greater).		Applies to production over 20,000 tons per year on the basis of Btu/lb heating quality of coal and whether mined by surface or underground techniques. Tax is on per ton or a value basis, whichever yields the greater amount of tax. Value means contract sales price.
		Btu/lb--	Surface--	
		Under 7,000.....	$0.12 or 20 pct	
		7,000-8,000.....	$0.22 or 30 pct	
		8,000-9,000.....	$0.34 or 30 pct	
		Over 9,000.....	$0.40 or 30 pct	
		Btu/lb--	Underground--	
		Under 7,000.....	$0.05 or 3 pct	
		7,000-8,000.....	$0.08 or 4 pct	
		8,000-9,000.....	$0.10 or 4 pct	
		Over 9,000.....	$0.12 or 4 pct	
	Mineral mining.....	Gross value.....	0.5 pct	Applies to gross value over $5,000, plus fee of $25.

New Mexico.....	Resource excise.....	.....do.....	0.75 pct	Imposed as a resources, processors, or service tax.
	Severance.....	Per ton.....	$0.38	Steam coal.
		.....do.....	$0.18	Metallurgical coal. On July 1, 1978, and each succeeding July 1, the tax rate on coal will be increased by a surtax based on changes in the consumer price index.
	Oil and gas conservation.....	Value.....	0.19 pct	Royalty payments to the United States, State, and Indian interests exempted. Rate may be raised or lowered depending on amount in conservation fund. Some expenses deductible.
North Dakota...	Coal severance.....	Per ton.....	$0.65	Tax may be increased $0.01 per ton for every 1-point increase in the wholesale price index. Expires June 30, 1979.
Ohio.....	Resource severance.....	.....do.....	$0.04	
	Coal excise.....	.....do.....		Applies to any consumer using more than 200 tons per year for generating steam or electric power. Tax based on sulfur content of coal delivered. Tax adjusted for processing to remove sulfur.
		Sulfur content--		
		Minus 0.5 pct.....	$0.40	
		0.5-1.0 pct.....	$0.35	
		1.0-1.5 pct.....	$0.30	
		1.5 pct plus.....	$0.15	
South Dakota...	Oil and gas severance.....	Gross value.....	4.5 pct	In lieu of all other mineral taxes except sales, use, and property taxes.
Tennessee.....	Coal severance.....	Per ton.....	$0.20	
Wyoming.....	Mining excise and severance..	Gross value.....	10.5 pct	In lieu of taxes on land.

TABLE 13. - Mineral severance taxes--rates, bases, other features--metals

State	Tax	Base	Rate	Other features
Alabama.....	Iron ore mining.....	Per ton.....	$0.03	Iron ore.
Arkansas.....	Natural resources severance..	.....do.....	$0.15	Barite, bauxite, titanium ore, manganese and manganese ores, zinc ore, cinnabar, and lead ore.
			$0.02	Iron ore.
				No other privilege or excise tax on natural resources.
Colorado.....	Severance.....	Gross income.....	2.25 pct	All metals except molybdenum. On gross income exceeding $11 million only. Credit allowed for ad valorem assessed, not to exceed 50 pct of Severance Tax.
		Per ton.....	$0.15	Molybdenum ore.
Florida.....	Solid minerals.....	Market value.....	5 pct	Includes rare earths.
Idaho.....	Ore severance.....	Net value.....	2 pct	All ores.
Louisiana.....	Natural resources severance..	Per ton.....	$0.10	Do.
Minnesota.....	Iron severance.....	Net value.....	15.5 pct	All ores except taconite, semitaconite, and iron sulfides.
		.....do.....	15 pct	Taconite, semitaconite, and iron sulfides. Credits for underground mining and beneficiation.
	Ore royalty.....			Applies same rates as Iron Severance Tax to all royalties.
	Taconite, iron sulfides, and agglomerates.	Per ton.....	$1.25	Taconite and iron sulfides. Beginning in 1978 will be indexed to steel production and not less than $1.25 per ton. Tax is in addition to Iron Severance Tax and Ore Royalty Tax, but in lieu of all other taxes; 1.6 pct of total tax per ton added for each 1 pct over 62 pct iron content.
			$0.05	Agglomerates.
		.....do.....	$0.10	An additional tax imposed on tailings not disposed of in accordance with permits. A tax of up to $10 per acre is levied on certain reserve lands.
	Semitaconite.....	.....do.....	$0.10	Tax is $0.05 per ton if agglomerated or sintered in Minnesota. Add $0.001 per ton for each 1 pct of iron content above 55 pct. Tax is in addition to Iron Severance Tax and Ore Royalty Tax, but in lieu of all other taxes. A tax of $1 per acre is levied on certain reserve lands.
	Copper-nickel.....	Net value.....	1 pct	Occupational tax of 1 pct of value and an additional mining, quarrying, and production tax of $0.025 per gross ton. Additional tax for higher grade ores. Certain expenses deductible from value. Tax on royalties is 1 pct plus an additional 1 pct of royalties paid on gold, silver, platinum, and other precious metals. In addition to other taxes, but in lieu of Iron Severance Tax.
		Per gross ton.....	$0.025	

Montana.....	Metalliferous mines license..	Gross value--		All metals and precious and semiprecious stones.
		Up to $100,000.....	0.15 pct	
		$100,000-$250,000.....	0.575 pct	
		$250,000-$400,000.....	0.86 pct	
		$400,000-$500,000.....	1.15 pct	
		Over $500,000.....	1.438 pct	
	Mineral mining.....	Gross value.....	0.5 pct	$25 plus 0.5 pct on gross value over $5,000.
Nevada.....	Net proceeds of mines.....	Net proceeds.....	Local property tax rate.	Applies local property tax rate to net proceeds of all mines in State.
New Mexico.....	Resources excise.....	Gross value.....	0.75 pct	All metals except molybdenum. Imposed as a resources, processors, or service tax.
			0.125 pct	Molybdenum.
	Severance.....	Value.....	0.5 pct	Copper. Some production expenses deductible.
		Per pound.....	$0.05-$3.24	Uranium. Rate varies with value of U_3O_8. For example, if value is $40 to $50 per pound, tax is $1.99 per pound plus 12.5 pct of excess over $40. Surtax on ore valued over $50 based on consumer price index.
			0.125 pct	Thorium, rare earth metals, gold, silver, lead, zinc, molybdenum, manganese, and all other metals. Gross value is defined for various commodities.
	Oil and gas conservation.....	Value.....	0.19 pct	Uranium. Value is 25 pct of resources excise value.
Oklahoma.....	Oil, gas, and mineral gross production.	Gross value.....	0.75 pct	Lead, zinc, jack, gold, silver, and copper.
		.....do.....	5 pct	
South Dakota...	Mineral severance.....			Uranium.
		Net profits.....	4 pct	All minerals including gold, silver, other precious metals, iron ore, and uranium; $100,000 market value minimum.
Utah.....	Mining occupation.....	Gross value.....	1 pct	Gold, silver, copper, lead, iron, zinc, tungsten, uranium, and other valuable metals; $50,000 exemption each mine.
Wisconsin.....	Metalliferous minerals occupation.	Average net proceeds...		Metalliferous minerals. Average net proceeds is based on preceding 3 years. Deductions allowable to reach net proceeds are specified.
		$100,000-$4 million....	6 pct	
		$4 million-$10 million.	12 pct	
		$10 million-$20 million	16 pct	
		$20 million-$30 million	18 pct	
		Over $30 million.....	20 pct	
Wyoming.....	Mining excise and severance..	Gross value.....	2 pct	Any valuable deposit. In lieu of taxes on the land.
		.....do.....	5.5 pct	Uranium.

TABLE 14. - Mineral severance taxes--rates, bases, other features--nonmetals

State	Tax	Base	Rate	Other features
Arkansas.....	Natural resources severance..	Per ton.....	$0.01	Crushed stone, including chert, granite, slate, novaculite, limestone, construction sand, gravel, clay, chalk, shale, and marl.
		.....do.....	$0.015	Gypsum (sold for out-of-State use) chemical grade, limestone, silica sand, and dimension stone.
		Per 1,000 bbl.....	$2	Salt water used as raw material for bromine. Plus $25 per well Conservation Tax.
		Market value.....	5 pct	Diamonds, fuller's earth, ochre, natural asphalt, native sulfur, salt, pearls, other precious stones, whetstone, novaculite, and all other natural resources.
Colorado.....	Severance.....	Gross proceeds.....	4 pct	Oil shale. Graduated to 4 pct by fourth year after production reaches 50 pct of design capacity; first 15,000 tons or 10,000 bbl per day exempted; 25 pct credit for in situ methods.
Florida.....	Solid minerals.....	Market value.....	5 pct	Includes clay, gravel, lime, shells (excluding live shellfish), stone, sand, and rare earths. Limited credit allowed for ad valorem taxes paid on property. No tax on minerals extracted to improve site upon which Florida sales tax is paid or which is sold to government agencies in Florida. Refund allowable for reclamation program.
			10 pct	Phosphate rock.
Idaho.....	Ore severance.....	Net value.....	2 pct	All ores.
Louisiana.....	Natural resources severance..	Per ton.....	$0.03	Sand and and gravel and stone.
		.....do.....	$0.06	Salt.
		.....do.....	$0.005	Salt from brine used in manufacturing.
		.....do.....	$0.04	Shells.
		.....do.....	$0.10	Ores.
		.....do.....	$0.20	Marble.
		Per long ton.....	$1.03	Sulfur.

Mississippi....	Salt severance.....	Value.....	3 pct	Salt.
Montana.....	Micaceous minerals license...	Per ton.....	$0.05	Vermiculite, perlite, kerrite, maconite, or any other micaceous minerals.
	Cement license.....	.....do.....	$0.22	Cement.
		.....do.....	$0.05	Cement, plaster, gypsum, and gypsum products.
	Mineral mining.....	Gross value.....	0.5 pct	All minerals; $25 plus 0.5 pct on gross value over $5,000.
Nevada.....	Net proceeds of mines.....	Net proceeds.....	Local property tax rate.	Applies local property tax to net proceeds of all mines in State.
New Mexico.....	Resources excise.....	Gross value.....	0.75 pct	All taxable nonmetals (except potash). Imposed as a resources, processors, or service tax.
		.....do.....	0.5 pct	Potash (if taxed under Resources Tax; 0.125 pct if under Processors Tax).
	Severance.....	.....do.....	2.5 pct	Potash. Gross value defines as 0.333 pct of proceeds less deduction for expenses.
		.....do.....	0.125 pct	Clay, gravel, gypsum, sand, fluorspar, pumice, and all other nonmetals. Gross value defined for individual commodities.
Ohio.....	Resource severance.....	Per ton.....	$0.01	Limestone, dolomite, and sand and gravel.
		.....do.....	$0.04	Salt.
Oklahoma.....	Oil, gas, and mineral gross production.	Gross value.....	0.75 pct	Asphalt.
South Dakota...	Mineral severance.....	Net profits.....	4 pct	All minerals including limestone, soda, saline, trona, bentonite; $100,000 market value minimum.
Texas.....	Cement distributors.....	Per 100 lb.....	$0.0275	
	Sulfur production.....	Per long ton.....	$1.03	
Wyoming.....	Mining excise and severance..	Gross value.....	2 pct	Any valuable deposits (except trona and oil shale).
			5.5 pct	Trona.
			4 pct	Oil shale.

Source: Commerce Clearing House, Inc. State Tax Guide: All States, New York, Chicago, and Washington, 1967 (with updated supplements to March 1978).

SUMMARY AND CONCLUSIONS

It is contended, and probably true, that mining is sufficiently different from other types of business enterprise in terms of economic structure, risk, and uncertainty to require tax treatment different from other types of industry, if all are to be equitably treated. The appropriate type and level of taxation depends upon the particular circumstance of the mine being taxed, market conditions of the mineral commodity involved, and how much of the return to the mining firm is considered to be pure economic rent due to the natural qualities of the mineral resource.

The major source of revenue for local governments has traditionally been the ad valorem property tax. The property tax has particular limitations when applied to mineral property, the most formidable being that of evaluation. Because mineral resources are generally hidden at varying depths in the earth, their value cannot be accurately known until they are mined out, making accurate or fair assessment for tax purposes difficult. Also, because the property tax liability accrues every year until depletion of the resource, whether it is mined or not, it is widely believed that this tax affects the time preference of mining, encourages mining out from under the tax, and results in less than optimum development of resources.

The severance tax is applied uniquely to the production of natural resources and avoids these shortcomings. It is usually a State imposed tax, although some States permit counties also to impose a severance tax. The severance tax is defined as "a tax imposed distinctively on the removal of natural resources from land or water and is measured by value or quantity of products removed or sold" (38). It is most generally applied to nonrenewable natural resources such as minerals. It is usually considered an excise tax paid for the privilege of mining. A severance tax may be specific, a direct rate levied against units of production, tons, barrels, or pounds; or it may be ad valorem, in the form of a percentage of value of production. In either case, the tax liability is incurred only if production takes place. Profitability of the operation is not taken into consideration unless the tax base is defined as net income. Except when levied against net income, a severance tax is a direct variable cost of production and should be viewed as being a deduction from the value received by the producer. A severance tax may be general, applying to all minerals, or selective, applying to specified minerals only.

Arguments advanced in favor of the severance tax include:

1. Simplicity and economy of administration, which are difficult to avoid.

2. Compensates a State for the removal of an irreplaceable resource.

3. A means of equalizing the tax treatment of mining.

4. Can be a productive source of revenue for a State.

5. Forces the mining firm to pay more of the social cost sometimes associated with mining--it internalizes some of the external cost of mining.

6. Permits taxing of absentee owners and shifting burden of taxes to consumers in other States.

7. Promotes mineral conservation in the sense that it encourages stretching out production.

8. Permits statewide sharing of fiscal benefits.

9. Can be used to discourage or delay unwanted mineral activities.

Arguments opposing use of the severance tax on mineral production include:

1. May be an unstable, unpredictable source of revenue because it is linked to production in a rather volatile industry.

2. May have an unfavorable impact on mineral resource development and production; added cost eliminates marginal producers; added cost also encourages high grading and, by raising cutoff grades, impairs conservation by reducing economically recoverable reserves; added cost contributes to inflation and makes the taxed mineral less competitive internationally.

3. Discriminates against the mining industry as a group, and promotes inequality of tax treatment among different mines and minerals; impairs the mining industry's ability to compete with other industries for labor and capital.

4. The natural heritage argument has no legal foundation and may lockup today's resources for future generations when that resource may not be needed; it is an assertion by the State of a royalty interest in resources it does not own.

5. May discourage expansion of the mining industry, which creates useful resources out of otherwise unusable rock; mining does not remove value from a State, on the contrary, it creates value where none existed before.

6. Contrary to national policy of decreasing energy dependence on foreign sources.

7. Creates tension between a State and local government if in lieu of local property taxes.

Much of the effect of a severance tax, both on the decisionmaking process of an individual mining firm and on its revenue yielding potential to a State government, depends upon the base against which it is levied--gross or net income or receipts, unit or value of production, rates assessed, exclusions and deductions allowed, and its importance in the cost structure of the particular mining industry concerned.

A severance tax does not penalize a mining operation by continuing its tax obligations when production is curtailed owing to strikes, operational problems, or market depressions. In this sense, it is more closely related to a mining firm's ability to pay. However, a severance tax on physical volume produced discriminates against lower value ore and favors higher grade ore. It also makes no distinction between profitable and unprofitable operations, taxing both alike. On the tax revenue recipient's side, the unit severance tax does not adjust automatically to inflation and its effects on local revenue needs. A severance tax based on gross or net receipts or income would make a better adjustment in both cases.

A severance tax, by increasing costs, does raise the cutoff grade of economically minable ore resulting in decreased mineral reserves, and in certain circumstances may retard the rate of production as well. The ability of the mining firm to pass the burden of severance tax forward or backward depends on the industry structure and the markets faced. In some mineral markets, the individual producer is a price taker selling at world prices in which case his ability to shift the tax burden to consumers would be limited.

A severance tax on minerals is currently being used by 29 States which produce about 80 percent of the Nation's minerals. In 19 of these States it is in lieu of all other ad valorem taxes on minerals. The severance tax is most frequently applied to oil and gas production. Twenty-seven States have a severance tax on oil, 16 on metals, 14 on nonmetals, and 11 on coal. Oil and gas accounted for about 87 percent of severance tax receipts in 1977. Two States, Texas and Louisiana, received 66 percent of all 1977 severance taxes. The $2.1 billion total severance tax revenue in 1977 was about 4.1 percent of total State tax collections in States with severance taxes for that year and about 3.4 percent of the mineral value produced in those States. The contribution of severance taxes to total State revenues was 5 percent or more in eight States, ranging up to 29 percent in Louisiana.

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